



PHD

Human thriving

a conceptualization, understanding, and application to sport

Brown, Daniel

Award date:
2017

Awarding institution:
University of Bath

[Link to publication](#)

Alternative formats

If you require this document in an alternative format, please contact:
openaccess@bath.ac.uk

Copyright of this thesis rests with the author. Access is subject to the above licence, if given. If no licence is specified above, original content in this thesis is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC-ND 4.0) Licence (<https://creativecommons.org/licenses/by-nc-nd/4.0/>). Any third-party copyright material present remains the property of its respective owner(s) and is licensed under its existing terms.

Take down policy

If you consider content within Bath's Research Portal to be in breach of UK law, please contact: openaccess@bath.ac.uk with the details. Your claim will be investigated and, where appropriate, the item will be removed from public view as soon as possible.

Human Thriving: A Conceptualization, Understanding, and Application to Sport

Daniel James Brown

A thesis submitted for the degree of Doctor of Philosophy
University of Bath
Department for Health
December 2016

COPYRIGHT

Attention is drawn to the fact that copyright of this thesis rests with the author and copyright of any previously published materials included may rest with third parties. A copy of this thesis has been supplied on condition that anyone who consults it understands that they must not copy it or use material from it except as permitted by law or with the consent of the author or other copyright owners, as applicable.

This thesis may be made available for consultation within the University Library and may be photocopied or lent to other libraries for the purposes of consultation with effect from

Signed on behalf of the Faculty of Humanities and Social Sciences.

Abstract

Sport performers encounter various stressors as part of their involvement in competitive sport, and their ability to respond effectively to these demands is likely to dictate whether they thrive, manage, or succumb in competition. The purpose of this thesis was to provide the first systematic exploration of thriving in sport. To achieve this, extant thriving literature is first reviewed and a conceptualization of human thriving proposed. Namely, it is suggested that thriving is the joint experience of development and success, which can be realized through effective holistic functioning and observed through the experience of a high-level of well-being and a perceived high-level of performance. Four empirical studies are then presented which examined and compared the experiences of sport performers who thrived in competitive encounters to those who did not. In Studies 1 and 2, results of factor mixture analysis (see Chapter 3, N = 535) and latent class growth analysis (see Chapter 4, N = 175) supported the presence of a unique thriving group and identified possible relationships with personal enablers (e.g., resilient qualities) and process variables (e.g., basic psychological needs satisfaction; BPNS). Study 3 (see Chapter 5, N = 51) extended these findings using a diary study design, demonstrating that pre-game levels of BPNS and challenge appraisal positively predicted in-game functioning; although no evidence was found to support the presence of biomarkers for thriving. Study 4 (see Chapter 6, N = 18) utilized mixed methods and revealed that, although many of the themes were similar for sport performers in thriving and non-thriving groups, substantial differences existed in the expression of these codes and in the relationships between them. Overall, the findings in this thesis make a meaningful advancement to the human thriving literature, and provide psychologists with an initial foundation upon which they can develop interventions to facilitate thriving in sport performers.

Acknowledgements

I would like to offer my sincere regards to the people who have helped make this PhD thesis possible.

Thank you to Dr Rachel Arnold, Professor Martyn Standage, and Dr David Fletcher for supervising me through the PhD. Rach, thank you for allowing me to be your first PhD student and for acting as an awesome role model for me throughout. Your advice, guidance, and support have been invaluable over the past three years and I would not be where I am today without your help. I hope that you have enjoyed working with me, as I have learning from you. Thank you also, for being a good friend. Martyn, thank you for all your advice and critical insight throughout my PhD. Your guidance has challenged me to continually elevate the quality of my work and I have learnt many lessons along the way. Dave, thank you for not holding a grudge against me for deciding to return to Bath! I am truly grateful for all the skills you taught me and knowledge you imparted to me during my time at Loughborough, and for you agreeing to continue to advise me throughout my PhD.

I would also like to express thanks to Dr James Turner for your assistance during my PhD. James, thank you for providing your expertise in my psychophysiological study and for your patience in teaching me how to work in the laboratory. Thank you also to the participants who kindly volunteered to take part in my studies.

Thank you to my friends at the University of Bath and beyond for providing your support, encouragement, and positivity over the past three years. Thanks also for the endless opportunities to procrastinate during the PhD! These breaks have been invaluable in providing me with much needed time away from the thesis.

To Dad, Chris, Katie, and Jane thank you for attempting to understand why it is that I am still a student and what it is I do on a day-to-day basis. Your love will forever keep me humble and my gratitude for your endless support is immeasurable. To Emily, thank you for always being my rock and for sharing the highs and lows of my PhD with me. I am eternally grateful for your unwavering love and support. Finally, Mum, thank you for always believing in me and for encouraging me to push myself from a young age. Your memory has driven me throughout my journey and this thesis is dedicated to you.

Table of Contents

ABSTRACT	I
ACKNOWLEDGEMENTS.....	II
TABLE OF CONTENTS.....	III
TABLES AND FIGURES	VIII
Tables	viii
Figures.....	ix
LIST OF PUBLICATIONS.....	X
Publications Arising from the Thesis	x
Peer-Reviewed Journal Papers	x
Forthcoming Manuscripts	x
Peer-Reviewed Conference Communications and Proceedings	x
Other Publications Achieved During the Period of Postgraduate Study.....	xi
Peer-Reviewed Journal Papers	xi
Forthcoming Manuscripts	xi
Peer-Reviewed Conference Communications and Proceedings	xi
CHAPTER 1. GENERAL INTRODUCTION.....	1
1.1 Introduction.....	1
1.2 Thriving in Sport Performers	1
1.3 Personal Experiences of Coping and Thriving.....	2
1.4 Rationale for Thesis	3
1.5 Purpose of the Thesis	3
1.6 Structure of the Thesis.....	3
CHAPTER 2. HUMAN THRIVING: A CONCEPTUAL DEBATE AND	
LITERATURE REVIEW.....	5
Introductory Commentary.....	5
2.1 Abstract.....	7
2.2 Introduction.....	7
2.3 Critical Issues in Understanding Human Thriving	8
2.3.1 What is Thriving?	8

2.3.2 Assessment of Thriving	12
2.4 Influential Psychosocial Variables for Human Thriving.....	14
2.4.1 Personal Enablers.....	14
2.4.2 Contextual Enablers	18
2.4.3 Potential Processes.....	21
2.5 Future Directions for Research and Practice	22
2.6 Conclusion.....	24
2.7 Reference List	25
Closing Commentary	35

CHAPTER 3. THRIVING ON PRESSURE: A FACTOR MIXTURE

ANALYSIS OF SPORT PERFORMERS' RESPONSES TO COMPETITIVE SPORTING ENCOUNTERS	36
Introductory Commentary	36
3.1 Abstract.....	38
3.2 Introduction	38
3.3 Method	42
3.3.1 Participants.....	42
3.3.2 Procedure	43
3.3.3 Measures	43
3.3.4 Data Analysis	46
3.4 Results	47
3.4.1 Factor Mixture Analysis	47
3.4.2 Interpretation of the Four-Profile Solution	48
3.4.3 Prediction of Latent Profiles from Enabler and Process Variables.....	48
3.5 Discussion.....	54
3.6 Reference List	60
Closing Commentary	69

CHAPTER 4. ONE-OFF OR SERIAL THRIVERS? A LATENT CLASS

GROWTH ANALYSIS OF SPORT PERFORMERS' RESPONSES TO COMPETITIVE SPORTING ENCOUNTERS OVER TIME	70
Introductory Commentary	70
4.1 Abstract.....	72
4.2 Introduction	72

4.3	Method	75
4.3.1	Participants.....	75
4.3.2	Procedures.....	76
4.3.3	Measures	76
4.3.4	Data Analysis	77
4.4	Results	79
4.4.1	Measurement Invariance	79
4.4.2	Latent Class Growth Analysis	80
4.5	Discussion.....	83
4.6	Reference List	92
	Closing Commentary	98

CHAPTER 5. THE PREDICTION OF THRIVING IN ELITE ATHLETES: AN EXPLORATION OF POTENTIAL PROCESS VARIABLES AND SALIVARY BIOMARKERS			99
	Introductory Commentary		99
5.1	Abstract.....		101
5.2	Introduction.....		101
5.3	Method		105
5.3.1	Participants.....	105	
5.3.2	Study Design and Overview of Procedures	106	
5.3.3	Measures	106	
5.3.4	Data Analysis	109	
5.4	Results		111
5.4.1	Preliminary Analysis.....	111	
5.4.2	Process Variable Analysis.....	111	
5.4.3	Salivary Cortisol and DHEA	112	
5.5	Discussion.....		117
5.6	Reference List		123
	Closing Commentary		133

CHAPTER 6. A COMPARISON OF THRIVING AND NON-THRIVING ELITE HOCKEY PLAYERS' MATCH EXPERIENCES			134
	Introductory Commentary		134
6.1	Abstract.....		136

6.2	Introduction	136
6.3	Method	139
6.3.1	Design	139
6.3.2	Participants.....	139
6.3.3	Procedure	140
6.3.4	Interview Guide	140
6.3.5	Data Analysis	141
6.4	Results	142
6.4.1	Are Some Match Experience Codes Present for One Group but not the Other?.....	142
6.4.2	If a Match Experience Code is Present for Both Thriving and Non-Thriving Groups, is the Expression of that Code Different Between Them?	147
6.4.3	Are Some Relationships Between Match Experience Codes Present for One Group but not the Other?.....	149
6.4.4	If a Relationship is Present for Both Thriving and Non-Thriving Groups, is the Expression of that Relationship Different Between Them?.....	151
6.5	Discussion.....	153
6.6	Reference List	159
	Closing Commentary	163
	CHAPTER 7. GENERAL DISCUSSION AND CONCLUSIONS	164
7.1	Overview	164
7.2	Summary of Findings and Contribution of the Thesis	164
7.2.1	Conceptualization and Assessment of Thriving	165
7.2.2	Thriving Over Time	167
7.2.3	Physical Thriving	168
7.2.4	Influential Variables of Thriving in Sport Performers.....	168
7.3	Applied Implications.....	172
7.3.1	Development of Personal and Contextual Enablers.....	172
7.3.2	Removing or Alleviating Unnecessary Stressors.....	175
7.3.3	Utilizing Previous Thriving Experiences.....	175
7.4	Future Research Directions.....	176
7.4.1	Measurement of Thriving	176
7.4.2	Distinguishing Thriving from Competing Constructs	177

7.4.3 Analytical Lens Used to Investigate Thriving	178
7.4.4 Variables and Relationships.....	180
7.4.5 The Evaluation of an Intervention to Facilitate Thriving	182
7.5 Conclusion.....	182
REFERENCES.....	184
APPENDICES	195
Appendix One: Psychometric Questionnaires.....	196
Appendix Two: IRT Analysis.....	203
Appendix Three: Study 4 Example Interview Guide	204
Appendix Four: Study 4 Supporting Quotations	207

Tables and Figures

Tables

Table 2.1 Definitions of Thriving	13
Table 3.1 Descriptive Statistics and Correlations between Functioning Indices, Enablers, and Process Variables	49
Table 3.2 Fit Indices, Entropy, and Model Comparisons for Estimated Factor Mixture Models.....	50
Table 3.3 Description of the Four Latent Profiles based on Standardized Functioning Index Scores	51
Table 3.4 Results from the Multinomial Logistic Regressions for the Effects of Enabler and Process Variables on Functioning Profile Membership	52
Table 4.1 Results of the Longitudinal Measurement Invariance Tests	81
Table 4.2 Means, Variances, and Covariances between Study Variables for Functioning, Needs Satisfaction, and Needs Frustration Based on Most Likely Latent Class	84
Table 4.3 Latent Class Growth Analysis Model Selection Criteria for Functioning, Needs Satisfaction, and Needs Frustration (n = 173)	85
Table 4.4 Conditional Probabilities of Functioning Class Given Needs Satisfaction and Needs Frustration Class Membership (n = 173)	86
Table 5.1 Descriptive Statistics for Psychological Process Variables, Biomarkers Variables, and Functioning Indicators	113
Table 5.2 Latent Growth Model Fit Statistics	114
Table 5.3 Results from the Latent Growth Models with a Functioning Distal Outcome	115
Table S 1 Autonomy Satisfaction Items	203
Table S 2 Competence Satisfaction Items.....	203
Table S 3 Relatedness Satisfaction Items.....	203
Table S 4 Thriving and Non-Thriving Groups' Relationships between Codes and Supporting Quotations	207

Figures

Figure 3.1 Factor mixture analysis solutions for the four-profile model.	53
Figure 5.1 Mean concentration of salivary cortisol recorded in each of the four samples.	116
Figure 6.1 A conceptual map of the codes and relationships between codes experienced prior to an important competitive fixture for thriving and non- thriving groups.	143
Figure 6.2 A conceptual map of the codes and relationships between codes experienced during an important competitive fixture for thriving and non- thriving groups.	144
Figure 6.3 A conceptual map of the codes and relationships between codes experienced following an important competitive fixture for thriving and non-thriving groups.	145
Figure 7.1 Hypothesized process model depicting how enabler and process variables may impact functioning and, ultimately, result in thriving.	181

List of Publications

Publications Arising from the Thesis

Peer-Reviewed Journal Papers

Brown, D. J., Arnold, R., Fletcher, D., & Standage, M. (in press). Human thriving: A conceptual debate and literature review. *European Psychologist*.

Forthcoming Manuscripts

Brown, D. J., Arnold, R., Fletcher, D., & Standage, M. (2017). *A comparison of thriving and non-thriving elite hockey players' match experiences*. Manuscript in preparation.

Brown, D. J., Arnold, R., Standage, M., & Fletcher, D. (2017a). *One-off or serial thrivers? A latent class growth analysis of sport performers' responses to competitive sporting encounters over time*. Manuscript in preparation.

Brown, D. J., Arnold, R., Standage, M., & Fletcher, D. (2017b). *Thriving on pressure: A factor mixture analysis of sport performers' responses to competitive sporting encounters*. Manuscript submitted for publication.

Brown, D. J., Arnold, R., Standage, M., Turner, J. E., & Fletcher, D. (2017). *The prediction of thriving in elite athletes: An exploration of potential process variables and biomarkers*. Manuscript in preparation.

Peer-Reviewed Conference Communications and Proceedings

Brown, D. J., Arnold, R., Fletcher, D., & Standage, M. (August, 2015). Recent developments in thriving research in performance sport. In D. Fletcher (Chair), *Recent developments in resilience, growth and thriving research in performance sport*. Symposium presented at the 2015 American Psychological Association Annual Convention, Toronto, OT.

Brown, D. J., Arnold, R., Fletcher, D., & Standage, M. (December, 2015). *A review of the human thriving literature and examination of its application to sport*. Poster presented at the biannual meeting of the British Psychological Society Division of Sport and Exercise Psychology, Leeds, UK.

Brown, D. J., Arnold, R., Standage, M., & Fletcher, D. (December, 2016). *A latent profile analysis of sport performers' responses to competitive sporting encounters*. Paper presented at the annual meeting of the British Psychological Society Division of Sport and Exercise Psychology, Cardiff, UK.

Brown, D. J., Arnold, R., Standage, M., Turner, J. E., & Fletcher, D. (2017). The prediction of thriving in elite athletes: An exploration of potential process variables and biomarkers. In R. Arnold (Chair), *Thriving on pressure: Examining the stress experience of performers in elite sport and military domains*. Symposium accepted for presentation at the 14th World Congress of the International Society of Sport Psychology, Sevilla, Spain.

Other Publications Achieved During the Period of Postgraduate Study

Peer-Reviewed Journal Papers

- Brown, D. J., & Fletcher, D. (2017). Effects of psychological and psychosocial interventions on sport performance: A meta-analysis. *Sports Medicine*, 41, 77-99. doi:10.1007/s40279-016-0552-7
- Brown, D. J., Fletcher, D., Henry, I., Borrie, A., Emmett, J., Buzza, A., & Wombwell, S. (2015). A British university case study of the transitional experiences of student-athletes. *Psychology of Sport and Exercise*, 21, 78-90. doi:10.1016/j.psychsport.2015.04.002
- Sarkar, M., Fletcher, D., & Brown, D. J. (2015). What doesn't kill me: Adversity-related experiences are vital in the development of superior Olympic performance. *Journal of Science and Medicine in Sport*, 18, 475-479. doi:10.1016/j.jsams.2014.06.010

Forthcoming Manuscripts

- Arnold, R., & Brown, D. J. (2017). *Development of a longitudinal intervention for thriving in elite rugby union*. Manuscript in preparation
- Brown, D. J., Arnold, R., Reid, T., & Roberts, G. (2017). *A qualitative exploration of thriving in elite sport*. Manuscript submitted for publication.
- Cumming, S., Brown, D. J., Mitchell, S., et al. (2017). *Premier League academy football coaches' experiences of a tournament bio-banded for biological maturation*. Manuscript in preparation.
- Cumming, S., Brown, D. J., Mitchell, S., et al. (2017). *Premier League academy football players' experiences of competing a tournament bio-banded for biological maturation*. Manuscript submitted for publication.

Peer-Reviewed Conference Communications and Proceedings

- Barrett, L. S., Brown, D. J., & Fletcher, D. (October, 2014). *Psychological momentum in high level cricket: Players' and coaches' perspectives*. Poster presented at the 29th Annual meeting of the Association for Applied Sport Psychology, Las Vegas, NV.
- Brown, D. J., & Fletcher, D. (October, 2014). *Understanding personal growth in student athletes*. Poster presented at the 29th Annual meeting of the Association for Applied Sport Psychology, Las Vegas, NV.
- Brown, D. J., Arnold, R., & Reid, T. (July, 2015). *A qualitative study of thriving in elite athletes*. Poster presented at the 14th European Congress of Sport Psychology, Bern, Switzerland.
- Sarkar, M., Fletcher, D., & Brown, D. J. (December, 2013). *What doesn't kill me...: Adversity-related experiences are vital in the development of superior Olympic performance*. Oral presentation presented at the biannual meeting of the British Psychological Society Division of Sport and Exercise Psychology, Manchester, UK.

Chapter 1. General Introduction

1.1 Introduction

Thriving is a description frequently ascribed to athletes to portray connotations of achievement, control, enjoyment, positivity, and success. For example, within the popular media, headlines have included: “England’s Billy Vunipola thriving on Eddie Jones’ ‘love and compassion’” (Mairs, 2016), “Ben Stokes thriving under license to lead England in the field” (Macpherson, 2016), “Olly Woodburn: Winger ‘thriving’ at Exeter says head coach Rob Baxter” (BBC, 2016b), and “New England Patriots: Rob Gronkowski thriving with Tom Brady under center” (Shalin, 2016). However, ‘thriving’ is not solely reserved for individual athletes as teams have also been labelled in this way (see, e.g., BBC, 2016a; BT Sport, 2016; Windhorst, 2015). Furthermore, outside of sport, workforces (see, e.g., Stock & Bentley, 2009), companies (see, e.g., Pearson, 2014), and economies (see, e.g., Hsieh, 2013) have also been described as thriving. What is apparent from these colloquial uses of the term is that thriving reflects some level of development and success, but it appears that the characteristics of this development and success will be contingent on the context within which the term is used (i.e., the factors underpinning a thriving economy will differ to those which lead to a thriving individual). A similar observation can be made from the academic literature on thriving. Over the past 15 years, there has been a growing interest in thriving with researchers investigating the construct across the entire lifespan (i.e., new-borns to the elderly) and a variety of contexts (e.g., adolescent development, armed services). Broadly speaking, researchers have also perceived thriving to comprise development and success (cf. Bundick, Yeager, King, & Damon, 2010), resulting from life opportunity or life adversity (Feeney & Collins, 2015).

1.2 Thriving in Sport Performers

Although the topic of thriving has received attention from scholars in a variety of contexts and the term is frequently used within the sports media, scientific inquiry on the construct in the sporting environment has often been sporadic and disjointed. Where attempts have previously been made to examine thriving in athletes (see, e.g., Galli & Vealey, 2007; Gucciardi, Jackson, Hodge, Anthony, & Brooke, 2015; Gucciardi & Jones, 2012), researchers have adopted various

conceptualizations for the construct or have examined thriving as a supplementary variable. As a result, little knowledge has been gleaned on what it actually means to thrive in a sporting context, and what factors contribute to this experience. The lack of systematic investigation on thriving in sport is particularly surprising given the importance of development and success in competitive sport (see, e.g., Hollings, Mallett, & Hume, 2014), and the desirable outcomes that can occur when thriving (e.g., excellent performance) and following this experience (e.g., increased confidence; Brown, Arnold, Reid, & Roberts, 2017). A potential explanation for the limited exploration of thriving in sport may be that researchers have tended to focus their studies on the notion of performance under pressure and optimal coping with stress using a deficits-reduction approach (see, e.g., Ford & Gordon, 1999; Gould, Jackson, & Finch, 1993; Smith, Smoll, & Ptacek, 1990), rather than focusing on the experience of thriving using a strengths-based or positive psychological approach (Gordon & Gucciardi, 2011; Seligman & Csikszentmihalyi, 2000). That is, scholars have historically looked at reducing and correcting weaknesses (e.g., increased anxiety), instead of fostering strengths (e.g., mental toughness).

1.3 Personal Experiences of Coping and Thriving

The transition from the deficits reduction approach to the positive psychological approach within the literature is not too dissimilar to changes in my own, personal outlook on understanding and facilitating human behaviour. After having experienced a significant adversity in my childhood, I have spent long periods reflecting on the changes that it evoked within me and my siblings. Much of my initial contemplation focused on the detrimental effects of the event, such as the experience of trauma and the areas of my life where I felt that I was at a disadvantage compared to my peers. However, as I've matured, I've been able to reflect on the positive changes that resulted from my experience. Perhaps most apparent, is the change that I have experienced in my increased motivation to achieve and to be successful; something that has driven me to embark on a PhD. Notwithstanding my increased motivation, I have also experienced significant positive changes in my perception of the importance of family, in my confidence to overcome challenge, and in the relationships that I held with the people around me. Recognizing that adaptive outcomes can result from negative experiences has fostered a positivity that has driven me to embrace life's challenge as well as seeking

out opportunities (e.g., playing rugby, working on my PhD) to develop and be successful.

1.4 Rationale for Thesis

Since the turn of the century, increased application of the positive psychology movement to sport has brought about greater study and acquired knowledge on a variety of topics such as motivation (see, for a review, Standage, 2012), resilience (see, for a review, Galli & Gonzalez, 2015), and optimal experiences (e.g., well-being, Lundqvist, 2011). However, despite the expansion of literature on positive human functioning in sport, a lack of targeted inquiry has examined thriving in this setting and a lack of understanding persists on the key processes that underpin the construct. Thus, to better comprehend this complexity and advance understanding of thriving in sport performers, a systematic programme of research is needed which explores these variables, examines key processes, and provides a framework on which to base future scientific inquiry and applied practice. This thesis is designed to address these issues.

1.5 Purpose of the Thesis

The overall purpose of this thesis is to provide the first systematic exploration of thriving in sport. To achieve this purpose, the thesis specifically aims to 1) review extant thriving literature and propose a conceptualization of thriving that is applicable across populations and domains; 2) examine and compare the experiences of sport performers who thrived in competitive encounters to those who did not using cross-sectional, longitudinal, and mixed methods; and 3) provide sport psychologists with an initial foundation upon which they can begin to develop interventions to facilitate thriving in sport performers.

1.6 Structure of the Thesis

The thesis is organized into seven chapters comprising this introduction, a conceptual debate and literature review, four study chapters examining and comparing the experiences of sport performers who thrived in competitive encounters to those who did not, and a general discussion and conclusions. A brief description of each chapter is provided below.

Chapter 1 introduces human thriving in the context of sport and offer a justification for why research is needed in this area.

Chapter 2 reviews a number of existing theoretical and conceptual debates and proposes a conceptualization of human thriving, consolidates pertinent bodies of extant thriving research and elucidates potential personal and contextual enablers, and identifies noteworthy gaps within existing literature.

Chapter 3 reports a study examining sport performers' functioning in competitive encounters and characterizing response patterns for sport performers who thrived and those who did not.

Chapter 4 reports a study examining sport performers' levels of functioning over time, exploring whether common growth trajectories exist, and investigating whether changes in functioning coincide with changes in sport performers' perceptions of psychological needs satisfaction and frustration.

Chapter 5 reports a study examining whether it is possible to predict in-game thriving from pre-match perceptions of basic psychological needs satisfaction and challenge appraisal, and exploring the possibility of biomarkers existing for thriving.


Chapter 6 reports a study using mixed methods to explore and compare the experiences of elite sport performers who thrived in an important competitive fixture and those who did not. In so doing, it provides a novel insight into overlapping components of experience and aspects of performers' experiences that differed between groups.

Chapter 7 summarizes the main findings reported in the four studies presented in the thesis; assesses the contribution of the thesis to research and theory; presents the practical applications, limitations, and future directions of the research; and offers an overall conclusion of the thesis.

Chapter 2. Human Thriving: A Conceptual Debate and Literature Review

Introductory Commentary

To provide a conceptual foundation upon which to base the exploration and examination of thriving in sport performers within subsequent chapters, it was first necessary within this Chapter to review the extant thriving literature to establish whether a robust understanding of the construct exists. To achieve this foundation, the Chapter begins with a brief introduction to the construct and suggests why it has gained popularity with scholars. Following this, existing theoretical and conceptual debates are reviewed including discussions on what is meant by *thriving* and how it has previously been assessed. It was apparent from this review that previous attempts to conceptualize thriving have been restricted in temporality and context and, thus, an alternative conceptualization of human thriving is proposed to overcome these limitations. Within the next section, pertinent bodies of extant thriving research are consolidated to elucidate potential personal and contextual enablers for thriving. Furthermore, process variables previously suggested to indirectly link enablers to thriving are identified. The final section of the Chapter highlights gaps within the existing literature and offers future directions for research and practice.

This declaration concerns the article entitled:									
Human Thriving: A Conceptual Debate and Literature Review									
Publication status (tick one)									
draft manuscript	<input type="checkbox"/>	Submitted	<input type="checkbox"/>	In review	<input type="checkbox"/>	Accepted	<input checked="" type="checkbox"/>	Published	<input type="checkbox"/>
Publication details (reference)	Brown, D. J., Arnold, R., Fletcher, D., & Standage, M. (in press). Human thriving: A conceptual debate and literature review. <i>European Psychologist</i> .								
Candidate's contribution to the paper (detailed, and also given as a percentage).	<p>Formulation of ideas: The candidate proposed the initial construct of investigation and, through discussions with the co-authors, decided how best to review the literature and to present the findings. Candidate contribution = 70%</p> <p>Design of methodology: N/A</p> <p>Experimental work: The candidate conducted the review of the literature. Candidate contribution = 95%</p> <p>Presentation of data in journal format: The candidate drafted the manuscript in its entirety and formatted it according to journal specifications. The remaining authors read revisions of the manuscript prior to submission and provided comments accordingly. Candidate contribution = 80%</p>								
Statement from Candidate	This paper reports on original research I conducted during the period of my Higher Degree by Research candidature.								
Signed							Date	24/04/2017	

Evidence of permission to use published paper:

“The manuscript version accepted by the journal for publication may be shared as follows:

- As part of a grant application or submission of a thesis or doctorate: may be shared at any time.”

(Statement retrieved from <http://www.europeanpsychologist.eu/> on 24/04/17)

Data access statement: N/A

2.1 Abstract

Humans have an inherent drive for self-improvement and growth (Maslow, 1965; Ryan & Deci, 2002). In a quest to understand how humans achieve fulfilment, researchers have sought to explain why some individuals thrive in certain situations, whereas others merely survive or succumb. The topic of thriving has become popular with scholars, resulting in a divergent body of literature and a lack of consensus on the key processes that underpin the construct. In view of such differences, the purpose of this paper is threefold: (i) to review a number of existing theoretical and conceptual debates, and to propose a conceptualization of thriving applicable across different populations and domains; (ii) to consolidate pertinent bodies of extant thriving research and identify key personal and contextual enablers to inform applied practice; and (iii) to identify noteworthy gaps within existing literature so as to make recommendations for future research and, ultimately, support the development of effective psychosocial interventions for thriving.

2.2 Introduction

Human have an inherent drive for self-improvement and growth (Maslow, 1965; Ryan & Deci, 2002). This desire for personal fulfilment, however, can place humans in unfamiliar scenarios (e.g., first day at school, job promotion, getting married) and expose them to situational demands that they likely react to in a wide range of ways. For instance, on occasions, these demands may prove overwhelming and some individuals may subsequently struggle with and succumb to the scenario, whereas in other instances, individuals may manage and survive. Alternatively, when exposed to a scenario, individuals may *thrive*; that is, they may grow or develop well and vigorously, and they may prosper and be successful (cf. Simpson, Weiner, Murray, & Burchfield, 1989; Soanes & Stevenson, 2005).

Within the academic literature, the quest for understanding human fulfilment and thriving gathered momentum towards the end of the 20th century. This focus culminated in the *American Psychologist* publishing a Positive Psychology special issue for their millennial edition (see, Seligman & Csikszentmihalyi, 2000a), which marked a prominent landmark in the field of psychology and set in motion a paradigmatic shift from an emphasis on pathology towards positive human functioning (cf. Seligman & Csikszentmihalyi, 2000b). Indeed, in the introductory article of the special issue, Seligman and Csikszentmihalyi (2000b) concluded with a

prediction that, in the 21st century, “a psychology of positive human functioning will arise that achieves a scientific understanding and effective interventions to build thriving in individuals, families, and communities” (p. 13). Researchers continue to work towards this goal and a recent review of positive psychology literature found that the field had burgeoned since the special issue in 2000, with over 1300 articles published between 1999 and 2013 (Donaldson, Dollwet, & Rao, 2015). However, this expansion of human functioning literature has been divergent and a lack of consensus exists on many of the key processes that underpin thriving. Accordingly, within this paper, we aim to discuss a number of existing theoretical and conceptual debates, and propose a conceptualization of thriving applicable across different populations and domains; consolidate pertinent bodies of thriving research and identify key personal and contextual enablers; and identify noteworthy gaps within existing literature so as to make recommendations for future research. To address this aim, the narrative is split into three main sections: Critical Issues in Understanding Human Thriving, Influential Psychosocial Variables for Human Thriving, and Future Directions for Research and Practice.

2.3 Critical Issues in Understanding Human Thriving

2.3.1 What is Thriving?

Although the topic of *thriving* is of interest to many researchers, much confusion exists regarding what is explicitly meant by the term. In part, this confusion has resulted from ambiguity introduced from temporal and contextual variance in the construct (cf. Lerner, 2004). To elaborate on the temporal variation, Benson and Saito (2001) identified different thriving indicators for youth (e.g., positive nutrition, school success) and adult (e.g., community engagement, work effectiveness) populations. The variety of indicators suggest that thriving is multifaceted and may appear qualitatively different across individuals, making it difficult to integrate extant work and to establish a coherent operational definition to accurately reflect the construct across samples. In terms of contextual variance in the construct, researchers have espoused various conceptualizations based on the type of domain investigated (e.g., developmental, performance). Specifically, researchers examining human thriving in developmental domains (e.g., positive youth development) have generally conceptualized thriving as a developmental and growth oriented process (see, e.g., Benson & Scales, 2009; Bundick, Yeager, King,

& Damon, 2010; Lerner, Dowling, & Anderson, 2003), whereas in performance domains (e.g., business) thriving has typically been based on a sense of accomplishment, prosperity, success, and wealth (see, e.g., Bakker, van Veldhoven, & Xanthopoulou, 2010; Cui, 2007; Jackson, McDonald, & Wilkes, 2011; Sarkar & Fletcher, 2014). These domain-specific conceptualizations have resulted in a variety of thriving definitions (see Table 2.1), creating confusion as to whether thriving is a state, a process, or both a state and a process (cf. Benson & Scales, 2009). Additionally, questions remain as to whether thriving is a domain-specific experience or whether it requires a more global realization (Benson & Scales, 2009; see also, Sarkar & Fletcher, 2014). The divergent meanings of thriving and the lack of a commonly accepted definition is problematic for scholars, because conceptual consensus provides direction and boundaries for scientific inquiry (Kaplan, 1964). To overcome these issues and advance the field, a ubiquitous and robust definition of thriving is required that is applicable across different populations and domains.

When developing such a definition of thriving, it is necessary to identify the commonalities in existing definitions and conceptual interpretations. By reflecting on the definitions of thriving in Table 2.1, it is apparent that two recurrent themes are development and success. More specifically, the development component of thriving relates to progressive enhancements that are either of a physical (e.g., an infant learning to walk), psychological (e.g., learning adaptive coping styles), or social (e.g., establishing a friendship group) nature. The success component is typically evidenced through a variety of temporally and contextually relevant outcomes (e.g., attainment scores, cardiovascular capacity, wealth). Furthermore, thriving is recognized as being multifaceted in nature (see, e.g., Spreitzer et al., 2005), with development and success experienced in tandem rather than in isolation (cf. Su, Tay, & Diener, 2014). Indeed, Su et al. (2014) stated that “to thrive in life is not only marked by feeling of happiness, or a sense of accomplishment, or having supportive and rewarding relationships, but is a collection of all these aspects” (p. 272). Therefore, thriving can be broadly defined as *the joint experience of development and success*. The definition proposed here overcomes the temporal restrictiveness apparent in previous definitions that have been specific to certain age groups (e.g., Benson & Scales, 2009; Lerner et al., 2003), whilst also considering a more broad focus than definitions that have been devised for particular contexts (e.g., Spreitzer et al., 2005) or scenarios (e.g., Park, 1998). Furthermore, it

recognizes that thriving can be a global construct (e.g., an individual can be thriving in all areas of their lives) or it can be experienced in specific scenarios (e.g., an individual can be experiencing development and success in their schooling, but not necessarily in their sport).

To achieve both development and success an individual needs to experience holistic functioning (cf. Su et al., 2014), which has typically been determined through indices of well-being and performance (see, e.g., Sarkar & Fletcher, 2014; Scales et al., 2000; Spreitzer et al., 2005). Well-being is described as the state of being or doing well in life and can be categorized into physical (Scheier & Carver, 1987), emotional (Keyes, 2002), psychological (Ryff, 1989), and social (Keyes, 1998) dimensions. High levels of well-being are important for thriving as they demonstrate that the personal and social functioning necessary for development is occurring (cf. Ryan & Deci, 2001). Turning to performance, this is determined by the level of quality shown in the execution of an action, operation, or process (Simpson et al., 1989), and can be assessed, for example, on a range of artistic, athletic, cognitive, motor, or work-related tasks. An individual's performance on such tasks is considered to reflect their level of functioning (cf. Sarkar & Fletcher, 2014) and, if a high-level of functioning is achieved, superior performance may orientate an individual to achieve success (cf. Lerner et al., 2003; Scales et al., 2000). The multifaceted nature of thriving means that subjectively perceiving high levels on only one of these indices, however, would not be sufficient for an individual to achieve development and success. To elaborate, if an individual was to perceive a high-level of performance and experience a low-level of well-being (e.g., vitality) he or she may be successful, but this may be accompanied by negative outcomes that could, ultimately, undermine development (e.g., increased risk of burnout; Spreitzer et al., 2005). Conversely, if an individual was to experience a high-level of well-being but perceive a low-level of performance, it is likely that his or her impaired task execution would hinder success. Based on this summary, it is suggested that thriving can be realized through effective holistic functioning and observed through the experience of a high-level of well-being and a perceived high-level of performance. This adjectival description captures the essence of thriving in state form and in response to a situation. Longer term, if an individual repeatedly perceived high-levels of well-being and performance across a series of situations, then the experience of thriving could lead to sustained development and success

(Carver, 1998; see also, Sarkar & Fletcher, 2014).

It is important to differentiate thriving from other terms (e.g., prospering, resilience, growth, flourishing) referred to by scholars which may at first glance appear to be similar, yet have fundamental differences. To illustrate, the term prospering appears similar to thriving in that it captures the success component of thriving (cf. Soanes, & Stevenson, 2005); however, it is different because does not capture the developmental aspect. Resilience and growth are additional terms that have been closely associated with thriving, since all three terms have been used to reflect a capacity for positive adaptation to adversity. Specifically, following adversity, resilience is considered to represent a maintenance of functioning (Bonanno, 2004), whereas stress-related growth (Park, Cohen, & Murch, 1996), posttraumatic growth (Tedeschi & Calhoun, 1996), and thriving (O'Leary & Ickovics, 1995) have been suggested to describe establishing an elevated level of functioning. Despite this apparent similarity, resilience, growth, and thriving are distinct constructs because resilience and growth typically occur following an adverse event, but thriving does not depend on the occurrence of a negative encounter (Carver, 1998; Sarkar & Fletcher, 2014; Spreitzer et al., 2005). Instead, thriving can be experienced following both life adversity and life opportunity (see, Feeney & Collins, 2015); the similarity between thriving following adversity and growth following adversity remains an aspect of thriving which has not yet been satisfactorily addressed in the wider literature. Future research designed to address this issue is warranted.

The term that arguably has the greatest conceptual similarity with thriving is flourishing. An individual is said to be flourishing when he or she displays positive feeling and functioning in life and is, subsequently, described as mentally healthy (Keyes, 2002, 2003). Flourishing is similar to human thriving because both constructs are concerned with an individual's experience of development and success; however, attempts have been made in the extant literature to differentiate the two constructs (see, e.g., Benson & Scales, 2009; Spreitzer et al., 2005). For example, Benson and Scales (2009) identify spiritual development and prosocial orientations as explicit indicators of thriving in adolescent populations, whereas these themes are not pronounced in flourishing research (see, e.g., Keyes, 2007). The presentation of thriving including both well-being and performance components in the present paper highlights a further distinction between thriving and flourishing.

More specifically, although both constructs encompass subjective well-being (i.e., an individual's evaluations of their affective states and psychological and social functioning; Keyes & Waterman, 2003), thriving is distinct because it also encapsulates performance (see, e.g., Sarkar & Fletcher, 2014). Additionally, it is noted that flourishing focuses predominantly on psychosocial and emotional well-being (cf. Fredrickson, 2006; Fredrickson & Losada, 2005), whereas thriving typically encapsulates both an individual's mental health and his or her physical state (cf. Epel, McEwen, & Ickovics, 1998).

2.3.2 Assessment of Thriving

The aforementioned temporal and contextual variance in human thriving mean that various potential indicators of development and success exist, and have been proposed within the literature (see, Benson & Saito, 2001; Carver, 1998; Feeney & Collins, 2015; King et al., 2005; Lerner et al., 2003; Sarkar & Fletcher, 2014; Scales, Benson, Leffert, & Blyth, 2000; Spreitzer et al., 2005). In addition to monitoring the presence of these collections of indicators, psychometric measures of thriving have been developed either through the application of measures previously devised for other constructs (e.g., psychological well-being, stress-related growth; see, Cohen, Cimolic, Armeli, & Hettler, 1998; Su et al., 2014) or through the creation of domain and temporally specific measures (see, e.g., Benson & Scales, 2009; Lerner, von Eye, Lerner, Lewin-Bizan, & Bowers, 2010; Porath, Spreitzer, Gibson, & Garnett, 2012). To elaborate on the temporally specific measures, both Benson and Scales (2009) and Lerner et al. (2010) proposed measures to assess thriving in adolescents. These measures offer a comprehensive assessment of thriving within this age-group; however, they are not readily applicable to, and nor are they validated with, the broader population. In contrast, grounded in Spreitzer et al.'s (2005) suggestion that thriving comprised the joint experience of vitality and learning, Porath et al. (2012) devised a measure of thriving at work for application with all individuals. This measure has subsequently been applied in work (see, e.g., Paterson, Luthans, & Jeung, 2014) and sport (see, e.g., Gucciardi, Hanton, Gordon, Mallett, & Temby, 2015) contexts and has helped identify relationships between thriving and other variables (e.g., mental toughness, task focus). However, when considering the definition of thriving proposed in this paper, the dimensions of vitality and learning are too narrow because they only encapsulate the development aspect of thriving (cf. Spreitzer et al., 2005). Thus, a more systematic development

Table 2.1 *Definitions of Thriving*

Reference	Definition
O’Leary and Ickovics (1995, p. 122, 135)	“The effective mobilization of individual and social resources in response to risk or threat [or challenge]”
Park (1998, p. 269)	“A higher level of functioning in some life domain following a stressful encounter”
Walker and Grobe (1999, p. 152)	“The dynamic relationships among nutrition, weight, and psychosocial functioning across the life span, with positive and negative consequences for health”
Lerner, Dowling, and Anderson (2003, p. 176)	“A developmental concept that denotes a healthy change process linking youth with an adulthood status enabling society to be populated by healthy individuals oriented to integratively serve self and civil society”
Spreitzer, Sutcliffe, Dutton, Sonenshein, and Grant (2005, p. 538)	“The psychological state in which individuals experience both a sense of vitality and a sense of learning”
Benson and Scales (2009, p. 90)	“(1) Represents a dynamic and bi-directional interplay of a young person intrinsically animated and energized by discovering his/her specialness, and the developmental contexts (people, places) that know, affirm, celebrate, encourage, and guide its expression; (2) Involves ‘stability of movement’ or the ‘balance’ of movement toward something (Bill Damon, personal conversation, May 11, 2006), that is, thriving is a process of experiencing a balance between continuity and discontinuity of development over time that is optimal for a given individual’s fused relations with here or his contexts (per discussion of developmental continuity and discontinuity in Lerner, 2002); and (3) Reflects both where a young person is currently in their journey to idealized personhood, and whether they are on the kind of path to get there that could rightly be called one of exemplary adaptive development regulations”
Bundick, Yeager, King, and Damon (2010, p. 891)	“A dynamic and purposeful process of process of individual ↔ context interaction over time, through which the person and his/her environment are mutually enhanced”
Sarkar and Fletcher (2014, p. 47)	“A sustained high level of functioning and performance that is not necessarily dependent on the occurrence of a potentially traumatic event (cf. Carver, 1998)”
Su, Tay, and Diener (2014, p. 256)	“The state of positive functioning at its fullest range – mentally, physically, and socially”

of measures to assess thriving is needed.

2.4 Influential Psychosocial Variables for Human Thriving

The construct of thriving has been examined throughout the human lifespan (i.e., from infants to the elderly; see, e.g., Haynes, Cutler, Gray, & Kempe, 1984; Tremethick, 1997) and across a variety of contexts and domains such as during adversity (e.g., O’Leary & Ickovics, 1995), and in health (e.g., Wright & Birks, 2000), the military (e.g., Jarrett, 2013), work (e.g., Sumsion, 2004), and youth development (e.g., Gestsdottir, Urban, Bowers, Lerner, & Lerner, 2011). Within these diverse scenarios, researchers have identified an abundance of psychosocial variables that may facilitate thriving. These variables can be broadly separated into two groups: personal enablers and contextual enablers (cf. Carver, 1998; Spreitzer et al., 2005). Rather than providing an exhaustive list of all potential associations within these categories, the following synthesis aims to provide readers with a brief, narrative review of the enablers that have been identified in studies where thriving has been a target variable of interest¹. Accordingly, this section defines both types of enablers, presents examples of each, and discusses the evidence for their relationship with types of performance, well-being, and ultimately thriving. Further, the potential processes through which enablers may facilitate thriving are discussed.

2.4.1 Personal Enablers

Personal enablers are the attitudes, cognitions, and behaviours of an individual that help him or her to thrive (cf. Park, 1998). Examples of personal enablers identified in the thriving literature include, but are not limited to, a positive perspective (see, e.g., Sarkar & Fletcher, 2014), religiosity and spirituality (see, e.g., Park, 1998), proactive personality (see, e.g., Sumsion, 2004), motivation (see, e.g., Benson & Scales, 2009), knowledge and learning (see, e.g., Niessen, Sonnentag, & Sach, 2012), psychological resilience (see, e.g., Gan, Xie, Wang, Rodriguez, & Tang, 2013), and possessing social competencies (see, e.g., Tedeschi & Calhoun, 1996).

¹ It is acknowledged that the conceptualizations of thriving used in the included studies are likely to vary contingent on the authors’ chosen interpretation (e.g., considering thriving analogous with stress-related growth or as a sense of vitality and learning), and caution is therefore needed when extending previously identified enablers to the prediction of thriving as it is defined in this chapter.

2.4.1.1 Positive perspective

To elaborate on the role of a positive perspective as a personal enabler, thriving researchers initially proposed that being optimistic, having high self-efficacy, and being honest to one's values could enable individuals to thrive by maintaining task engagement when coping with an adversity or stressor (see, e.g., Carver, 1998; Park, 1998). This suggestion has subsequently been supported through qualitative research conducted with high achievers (Sarkar & Fletcher, 2014) and teachers (Sumsion, 2004), with the latter identifying a positive moral purpose and philosophical stance as important for sustaining personal and professional satisfaction, and thus increasing the likelihood of thriving in the context of a staffing crisis. However, an optimistic and hopeful perspective is not only applicable for thriving when faced with intense stressors. Under the broader rubric of developmental assets (Benson, Leffert, Scales, & Blyth, 1998) and adolescent strengths (Lerner, Lerner, & Benson, 2011), self-esteem, possessing positive views of one's personal future, and having hopeful future expectations have been explored as potential enablers for components of adolescent thriving (e.g., competence, success in school). Additionally, within the context of thriving at work, Niessen, Sonnentag, and Sach (2012) have suggested that optimism and self-efficacy are important variables for future research to consider.

2.4.1.2 Religiosity and spirituality

For some individuals, religiosity, spirituality, and faith were considered enablers of thriving. For example, Park (1998) speculated that religious coping may enable thriving and stress-related growth through one's relationship with God and a religious social support network. In addition to the direct effect of religiosity on development and success, religiosity can also act as a mediator on the relationship between spirituality and thriving (Dowling et al., 2004). Through their work, Dowling et al. (2004; see also, Dowling, Gestsdottir, Anderson, von Eye, & Lerner, 2003) found that spirituality, believed to reflect an individual's value in moral and civic identities, was directly related to thriving as a form of adolescent functioning, but also indirectly related through relationships with religiosity (i.e., participation in the practices of a faith-based institution related to a supernatural power).

2.4.1.3 Proactive personality

Another personal enabler previously linked with thriving is an individual's

proactive personality (see, e.g., Globerman, White, Mullings, & Davies, 2003; Sarkar & Fletcher, 2014; Sumsion, 2004). For example, Sarkar and Fletcher (2014) noted that thriving high achievers show a desire to actively seek out opportunities for challenge. Furthermore, Sumsion (2004) found that teachers who engaged in purposeful career decision making were more likely to thrive, and Globerman et al. (2003) identified that, by proactively articulating one's values to the organization, social workers were more likely to thrive in a hospital setting. Proactive personality has also been examined in the context of positive youth development, where researchers have examined the impact of intentional self-regulation on thriving (see, e.g., Gestsdottir et al., 2011). Grounded in the belief that individuals play an active role in their development (Brandtstädter & Lerner, 1999), Gestsdottir et al. (2011) proposed that adolescents adopt the self-regulatory processes of selection (i.e., selecting appropriate goal content), optimization (i.e., seeking resources that are compatible with personal values to pursue a goal), and compensation (i.e., avoiding or minimizing losses when faced with a loss of goal-relevant means) to obtain the resources from their environment that enable them to function optimally and thrive.

2.4.1.4 Motivation

Previous research has shown that thriving individuals are intrinsically motivated and energized by their personal talents and interests (Benson & Scales, 2009). To elaborate, an individual's core passions act as 'sparks' to fuel one's interest in growing knowledge and/or skills, drive the creation of a nurturing environment and, ultimately, enable thriving through the execution of actions that are mutually beneficial to the individual and his or her society (Benson & Scales, 2009; see also, Scales, Benson, & Roehlkepartain, 2011). High quality forms of motivation such as intrinsic motivation (i.e., engaging in an activity because the behaviour is inherently rewarding) may also arise and result in high-level performance and well-being when a task is perceived as being meaningful (i.e., has purpose and significance; Hackman & Oldham, 1980). To elaborate, Spreitzer et al. (2005) speculated that when an individual experienced positive meaning in their work, he or she would be more likely to engage in agentic (i.e., autonomous) behaviours that could ultimately lead to thriving. In support of this assertion, Niessen et al. (2012) found that employees who experienced positive meaning at work in the morning, showed signs of thriving (i.e., felt more vital, had a higher sense of learning) at the end of the working day.

2.4.1.5 Knowledge and learning

An individual's personal motivation is important for establishing his or her commitment to learning, and this desire to learn is relevant to thriving in all populations. For example, being motivated to learn is a key internal asset for adolescents, whose academic performance is often considered a marker of thriving (see, e.g., Lerner et al., 2005; Scales et al., 2000; Smith & Barker, 2009). In relation to adults, learning and possessing knowledge is important for thriving at work. Indeed, within the work literature, studies have highlighted that to thrive in their roles, employees should stay current and remain aware of recent developments in their field (Globerman et al., 2003), be knowledgeable (Niessen et al., 2012; Spreitzer et al., 2005), and possess psychological capital (Paterson et al., 2014). In addition to academic and vocational contexts, researchers have also found that under hardship, experience and learning (Sarkar & Fletcher, 2014) and excellence, wisdom, and creativity (Bradshaw, Richardson, & Kulkarni, 2007) are personal enablers that support development and success.

2.4.1.6 Psychological resilience

Possessing resilient qualities (e.g., flexibility and adaptability), or displaying resilience more generally, has frequently been advocated for thriving following an adversity or when experiencing strain (Beltman, Mansfield, & Price, 2011; Bradshaw et al., 2007; Gan et al., 2013; Jackson, Firtko, & Edenborough, 2007; Jarrett, 2013; Sarkar & Fletcher, 2014). To provide some examples, resilience was identified as important for thriving, assessed through positive future expectations and effective adjustment, in survivors of the 2008 Sichuan earthquake (Gan et al., 2013), and for combat soldiers exposed to sudden trauma (e.g., loss of a fellow soldier, perpetrating harm on others) and experiencing intense, unrelenting stressors (e.g., fatigue, prolonged separation from family; Jarrett, 2013). Similarly, within the vocational literature, Jackson et al. (2007) found that nurses who developed personal resilience were able to withstand workplace adversity (e.g., excessive workloads) and thrive (i.e., report higher levels of job satisfaction). Further, Beltman et al. (2011) noted that resilient protective factors (e.g., altruistic motives) assisted teachers to stay in their roles and to subsequently thrive, rather than just survive.

2.4.1.7 Social competencies

Across scenarios where an individual may thrive, it may be the case that his or her response will be affected by social agents present (e.g., family, friends, colleagues) and the perceived support available in that environment (Feeney & Collins, 2015). Interpersonal exchanges with parents, for example, may provide a young student with reassurance when preparing for a challenging examination. To access and benefit from these social exchanges, an individual will likely draw on personal enablers to enhance his or her ability to form an interpersonal bond and sustain a lasting connection. For example, social competencies such as peaceful conflict resolution and interpersonal/cultural competence enable an individual to retain his or her personal and environmental resources and employ them in an attempt to thrive (Benson et al., 1998).

2.4.2 Contextual Enablers

Contextual enablers are the characteristics of an environment which can foster continued task engagement and subsequent thriving (Carver, 1998). Some of these enablers apply across the majority of contexts (e.g., the opportunity for challenge), whereas others are more context specific (e.g., employer support). Examples of contextual enablers identified in the thriving literature include, but are not limited to, a challenge environment (see, e.g., O’Leary & Ickovics, 1995), attachment and trust (see, e.g., Carmeli & Spreitzer, 2009), family support (see, e.g., Weine et al., 2013), and colleague/employer support (see, e.g., Paterson et al., 2014).

2.4.2.1 Challenge environment

Research suggests that situations that provide an appropriate balance of challenge and difficulty can evoke task engagement and facilitate thriving (Carver, 1988; O’Leary & Ickovics, 1995). Examples of appropriate scenarios include those that offer learning and career opportunities (Bakker et al., 2010), a high promotion focus (Wallace, Butts, Johnson, Stevens, & Smith, 2016), and set boundaries and expectations (Benson et al., 1998). If a situation contains a high-level of hindrance stressors (i.e., those which thwart growth) and is perceived as having too much difficulty, this will result in a threat appraisal and, whilst still potentially evoking task engagement, undermine thriving (Carver, 1998; Flinchbaugh, Luth, & Li, 2015). Examples of situations that may be perceived as threatening include those which have a high level of turbulence and volatility as these reduce employees’ perceptions

of autonomy, competence, and relatedness, thus ultimately precluding feelings of development and success (cf. Spreitzer & Porath, 2014).

2.4.2.2 Attachment and trust

Interpersonal relationships can act as resources to permit the exploration of a challenging situation and the instigation of agentic behaviours which, in either case, can increase the likelihood of an individual thriving (Carver, 1998; Feeney & Collins, 2015; Spreitzer et al., 2005). Common factors that provide stable foundations for these interpersonal bonds and subsequent thriving are attachment and trust (Bowlby, 1969, Carver, 1998). For example, relationships established with a high security of attachment and acceptance from significant others can act as secure bases and safe havens for exploration. Trust implies a willingness to place personal vulnerability in the hands of another party on the belief that their future actions will be mutually beneficial (Robinson, 1996). In relation to thriving, Carmeli and Spreitzer (2009) found that trust in an employee-employer relationship was pertinent to an employee reporting high-levels of learning and vitality in his or her role. Interpersonal relationships built on secure attachment, acceptance, and trust can act as contextual enablers for thriving across the entire human lifespan (see, e.g., Haynes et al., 1984; Tremethick, 1997); however, it is likely that the significant partner in these relationships may change (e.g., parents, friends, colleagues, romantic partners, children).

2.4.2.3 Family support

The impact that parents could have on thriving first became clear in medical research investigating the failure-to-thrive syndrome (FTT) in new-born babies and infants (see, e.g., Bullard, Glaser, Heagarty, & Pivchik, 1967; Haynes et al., 1984). This developmental syndrome is characterized by signs of growth failure, severe malnutrition, and variable degrees of impaired development; and can result from organic (e.g., illness) or nonorganic (e.g., parental) causes (see, for a review, Elice & Fields, 1990). To elaborate on the nonorganic causes, Bullard et al. (1967) found evidence of parental neglect and maternal deprivation across 50 cases of infants who were experiencing FTT. Additionally, Haynes et al. (1984) identified differences in mother-child interactions between thriving and FTT groups. Although recent research has challenged the role of parental factors in FTT (see, e.g., Emond, Drewett, Blair, & Emmett, 2007; Wright & Birks, 2000), it is apparent that the

quality of parental care and the nature of interactions between the parent and child are important for an infant's positive growth and development (see, e.g., Connell & Prinz, 2002; Poehlmann & Fiese, 2001). This parental role also appears to extend to enabling thriving in adolescents, where parents may provide guidance in relation to an adolescent's schooling (see, e.g., Theokas et al., 2005) and financial support for the child to access facilitative opportunities and resources (see, e.g., Weine et al., 2013). More recent investigations have broadened extant research on family support to include the role of spouses in promoting thriving (see, Sarkar & Fletcher, 2014; Tomlinson, Feeney, & Van Vleet, 2016). Within these studies, partners were suggested to alleviate strain caused by time-related work pressures (Sarkar & Fletcher, 2014) and that their support acted as a relational catalyst for thriving through the support of goal-strivings (Tomlinson et al., 2016).

2.4.2.4 Colleague and employer support

On reaching adulthood and becoming employed, the social agents impacting on an individual's experience of development and success are likely to change from parents towards colleagues and employers (cf. Erikson, 1959; Levinson, 1986).

Working among a group of colleagues can provide an individual with a source of support and guidance for completing daily tasks and overcoming challenges. For example, an open environment that encourages broad information sharing between colleagues enables individuals to obtain necessary knowledge for completing novel tasks (Spreitzer & Porath, 2014) and an opportunity to air grievances (Sarkar & Fletcher, 2014). Furthermore, if an employee receives recognition from colleagues about their professional expertise or feels a valued part of the team, this can instil confidence and a sense of relatedness (Liu & Bern-Klug, 2013; Sumsion, 2004). Most recently, research has suggested that dyadic relationships between employees can become resilient to within-dyad adversity and that this resilience can, ultimately, help promote dyadic thriving over time (Thompson & Ravlin, 2016). These environmental and interpersonal features can, therefore, lead to colleagues acting as contextual enablers for enhanced performance and well-being.

Turning from colleagues to employers, Paterson et al. (2014) found a significant relationship between employees' perceptions of a supervisor supportive climate, their desire to work in collaboration with others, and thriving. Specifically, it was suggested that a supportive supervisor engenders agentic behaviours because employees will not be afraid to take risks under the belief that they will be supported,

and that these behaviours result in elevated learning and vitality (see also, Kahn, 1990). In addition to agentic behaviours, a supportive climate may also create various other enablers of thriving (e.g., job autonomy, decision-making discretion, perceived professional freedom and agency; see, e.g., Bakker et al., 2010; Liu & Bern-Klug, 2013; Spreitzer & Porath, 2014; Spreitzer et al., 2005; Sumsion, 2004; Wallace et al., 2016). Employers can further support employee development and success through the provision of performance feedback (Spreitzer & Porath, 2014). To elaborate, it is suggested that feedback provides employees with informational guidance about their job performance, which is likely to facilitate their perception of competence and, in turn, enable thriving (Spreitzer & Porath, 2014).

2.4.3 Potential Processes

Researchers have tended to focus on two processes through which enablers may facilitate thriving: the satisfaction of basic psychological needs and the manifestation of a challenge appraisal. Grounded within self-determination theory (Deci & Ryan, 1985; Ryan & Deci, 2000), it is proposed that humans have three basic psychological needs (i.e., for autonomy, competence, and relatedness) and experiencing satisfaction of these needs has been forwarded as a prerequisite for thriving (cf. Deci & Ryan, 2000; Sheldon, 2009). Indeed, in support for this assertion, extant research has found a relationship between needs satisfaction and thriving outcomes across a range of domains, including education (see, e.g., Sheldon & Krieger, 2007), the performing arts (see, e.g., Quested & Duda, 2010), sport (see, e.g., Reinboth, Duda, & Ntoumanis, 2004), and work (see, for a review, Spreitzer & Porath, 2014). Building from the conceptual standpoint of needs acting as the proximal determinants of thriving, researchers have examined how personal (e.g., perceiving positive meaning in work) and contextual (e.g., supportive work) enablers can influence an individual's perceptions of needs satisfaction and subsequent thriving (see, e.g., Spreitzer & Porath, 2014).

An alternative or additional mechanism linking personal and contextual enablers to thriving is the elicitation of a challenge appraisal (see, e.g., O'Leary & Ickovics, 1995). According to Lazarus and Folkman's (1984) transactional model of stress, upon experiencing a potential stressor humans make a judgement about whether the encounter is irrelevant, benign-positive, or stressful (i.e., expectations of harm/loss, threat, or challenge). Harm/loss appraisals are made when damage has already been sustained, whereas threat and challenge appraisals are made in the

expectation of future harm/loss or the potential for gain or growth, respectively (Lazarus & Folkman, 1984). Challenge appraisals thus encourage task engagement and create opportunities for positive change, and it is for these reasons that it has previously been associated with thriving (see, Carver, 1998, O'Leary & Ickovics, 1995). Furthermore, influencing the type of stress appraisal made by an individual is a range of personal (e.g., beliefs) and situational (e.g., predictability) factors (Lazarus & Folkman, 1984), which may relate to the personal and contextual enablers presented for thriving. For example, the personal enabler of proactive personality could influence a personal belief of control over a situation, which can increase the likelihood of making a challenge appraisal, engaging in a scenario, and potential thriving.

2.5 Future Directions for Research and Practice

It is apparent from the literature reviewed in this paper that thriving is of interest to a wide array of researchers and practitioners operating in diverse domains and contexts. However, to continue to advance knowledge and understanding of human thriving, various lines of research inquiry need to be conducted, and in a more coherent manner. The first challenge faced by human thriving researchers is to reach a consensus about what is meant by the construct. As explained in the first section of this paper, the temporal and contextual diversity in how thriving has been examined has resulted in a lack of consensus about the definition of the construct and the key processes that underpin it. In an attempt to address this issue, a definition of human thriving was presented that was conceived to be temporally and contextually robust. Specifically, human thriving was defined as *the joint experience of development and success*, which can be realized through effective holistic functioning and observed through the experience of a high-level of well-being and a perceived high-level of performance. Future research should examine the applicability and utility of this conceptualization in various settings, and refine it if appropriate. Furthermore, having agreed on a definition, the systematic development of valid and reliable measurement tools is required.

Turning from the definition to the processes underpinning thriving, it is suggested that researchers establish whether the enablers identified in the extant thriving literature support both development and success. In addition, it is recommended that scholars extend the contexts in which they examine personal and

contextual enablers. For instance, although considerable attention has been paid to contextual enablers of thriving at work (see, for a review, Spreitzer & Porath, 2014), there are limited specific investigations of thriving or its enablers in other areas (e.g., military, sport, the performing arts). Future research is also needed to examine and clarify the mechanisms that underpin the relationships between personal and contextual enablers and thriving. For example, although some human thriving researchers have proposed the role of agentic or autonomous behaviours in mediating the relationship between enablers and thriving (see, e.g., Spreitzer et al., 2005), others have espoused the role of challenge appraisals (see, e.g., O'Leary & Ickovics, 1995) and, thus, it may be beneficial for future work to examine whether these mechanisms work in isolation or are integrated. A further line of future research inquiry is the study of the lasting, and potentially cumulative, effect(s) of thriving on an individual (cf. Benson & Scales, 2009; Sarkar & Fletcher, 2014). Although the developmental consequences of early life FTT (see, e.g., Corbett & Drewett, 2004) and the effect of positive youth development (thriving) on future contribution and risk behaviours (see, e.g., Jellicic, Bobek, Phelps, Lerner, & Lerner, 2007) have already been longitudinally tracked in youth populations, sparse research exists on the lasting effect of thriving in adult samples. To illustrate, little is currently known about whether (and how) thriving in response to one situation (e.g., salesperson closing a deal) significantly affects responses to future scenarios (e.g., future sales pitches); nor is there any evidence on the impact of thriving in one area of life (e.g., sport) on other areas (e.g., academic attainment).

Establishing a robust understanding of human thriving and underpinning processes also has implications for professional practice. To elaborate, the identification of situation salient enablers will assist practitioners in designing and delivering targeted, evidence-based interventions that facilitate the experience of development and success. One example of an existing intervention that aims to facilitate thriving is the Warrior Resilience and Thriving program (WRT; Jarrett, 2013) implemented by the U.S. Army. Specifically, the program teaches soldiers strategies to enhance personal and contextual enablers such as resilience, emotional control, and critical thinking. Treatment programs such as the WRT have traditionally been developed using the framework of post-traumatic growth and, therefore, focus on thriving following extreme adversities. In addition to refining and trialling such interventions in other settings, there is also a need to develop

interventions that are appropriate for thriving in non-traumatic situations and for responding to daily stressors. When designing such interventions, practitioners may draw lessons from the appraisal literature to increase an individual's awareness and accuracy when interpreting situational demands and resources (e.g., Lazarus & Folkman, 1984). Furthermore, by considering the enabler literature presented and discussed in this paper (e.g., Lerner et al., 2011; Spreitzer & Porath, 2014), psychologists can develop personal enablers with the individual (see, e.g., Melnyk, Kelly, Jacobson, Arcoleo, & Shaibi, 2014) and optimize contextual enablers in the surrounding environment (see, e.g., Spreitzer, Porath, & Gibson, 2012) to facilitate individuals' experiences of development and success. Finally, once a greater understanding of the cumulative effect of thriving is established, practitioners might construct strategies to assist individuals in repeating their thriving response in future scenarios.

2.6 Conclusion

As anticipated by Seligman and Csikszentmihalyi (2000b), there has been a burgeoning of academic inquiry on the psychology of positive human functioning since the turn of the century. This review, however, has highlighted that much of this human functioning literature has been divergent and a lack of consensus exists on the definition and conceptualization of the main target outcome, human thriving. In recognition of this, we have discussed existing theoretical and conceptual debates, reviewed extant literature examining enablers of thriving, and made recommendations for future investigations on this topic. Furthermore, a conceptualization of human thriving is presented, whereby thriving is defined as *the joint experience of development and success*, which can be realized through effective holistic functioning and observed through the experience of a high-level of well-being and a perceived high-level of performance. Overall, it is hoped that this conceptualization will provide readers with some clarity on the construct of thriving and that the identification of salient psychosocial variables will stimulate further scientific inquiry to support the development of effective psychosocial interventions for thriving.

2.7 Reference List

- Bakker, A. B., van Veldhoven, M., & Xanthopoulou, D. (2010). Beyond the demand-control model: Thriving on high job demands and resources. *Journal of Personnel Psychology, 9*, 3-16. doi:10.1027/1866-5888/A000006
- Beltman, S., Mansfield, C., & Price, A. (2011). Thriving not just surviving: A review of research on teacher resilience. *Educational Research Review, 6*, 185-207. doi:10.1016/j.edurev.2011.09.001
- Benson, P. L., Leffert, N., Scales, P. C., & Blyth, D. A. (1998). Beyond the "village" rhetoric: Creating healthy communities for children and adolescents. *Applied Developmental Science, 2*, 138-159. doi:10.1207/s1532480xads0203_3
- Benson, P. L., & Saito, R. (2001). The scientific foundation of youth development. In N. Jaffe (Ed.), *Youth development: Issues, challenges, and directions* (pp. 125-148). Philadelphia, PA: Public/Private Ventures.
- Benson, P. L., & Scales, P. C. (2009). The definition and preliminary measurement of thriving in adolescence. *The Journal of Positive Psychology, 4*, 85-104. doi:10.1080/17439760802399240
- Boddy, J. M., & Skuse, D. H. (1994). The process of parenting in failure to thrive. *Child Psychology & Psychiatry & Allied Disciplines, 35*, 401-424. doi:10.1111/j.1469-7610.1994.tb01731.x
- Bonanno, G. A. (2004). Loss, trauma, and human resilience: Have we underestimated the human capacity to thrive after extremely adverse events? *American Psychologist, 59*, 20-28. doi:10.1037/0003-066X.59.1.20
- Bradshaw, B. G., Richardson, G. E., & Kulkarni, K. (2007). Thriving with diabetes: An introduction to the resiliency approach for diabetes educators. *Diabetes Educator, 33*, 643-649. doi:10.1177/0145721707303808
- Brandtstädter, J., & Lerner, R. M. (Eds.). (1999). *Action and self-development: Theory and research through the life-span*. Thousand Oaks, CA: Sage.
- Bullard, D. M., Glaser, H. H., Heagarty, M. C., & Pivchik, E. (1967). Failure to thrive in the "neglected" child. *American Journal of Orthopsychiatry, 37*, 680-690. doi:10.1111/j.1939-0025.1967.tb00509.x
- Bundick, M. J., Yeager, D. S., King, P. E., & Damon, W. (2010). Thriving across the life span. In R. M. Lerner, M. E. Lamb, & A. M. Freund (Eds.), *The handbook of life-span development* (pp. 882-923). Hoboken, NJ: John Wiley

& Sons, Inc.

- Carmeli, A., & Spreitzer, G. M. (2009). Trust, connectivity, and thriving: Implications for innovative behaviors at work. *Journal of Creative Behavior*, 43, 169-191. doi:10.1002/j.2162-6057.2009.tb01313.x
- Carver, C. S. (1998). Resilience and thriving: Issues, models, and linkages. *Journal of Social Issues*, 54, 245-266. doi:10.1111/0022-4537.641998064
- Casey, P. H. (1987). Failure to thrive: Transactional perspective. *Journal of Developmental and Behavioral Pediatrics*, 8, 37-38.
- Cohen, L. H., Cimboric, K., Armeli, S. R., & Hettler, T. R. (1998). Quantitative assessment of thriving. *Journal of Social Issues*, 54, 323-335. doi:10.1111/0022-4537.681998068
- Connell, C. M., & Prinz, R. J. (2002). The impact of childcare and parent-care interactions on school readiness and social skills development for low-income African-American children. *Journal of School Psychology*, 40, 177-193. doi:10.1016/S0022-4405(02)00090-0
- Corbett, S. S., & Drewett, R. F. (2004). To what extent is failure to thrive in infancy associated with poorer cognitive development? A review and meta-analysis. *Journal of Child Psychology and Psychiatry*, 45, 641-654. doi:10.1111/j.1469-7610.2004.00253.x
- Cui, Y. (2007). Striving and thriving: Women in Chinese national sport organizations. *International Journal of the History of Sport*, 24, 392-410. doi:10.1080/09523360601101378
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York, NY: Plenum.
- Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11, 227-268. doi:10.1207/S15327965PLI1104_01
- Donaldson, S. I., Dollwet, M., & Rao, M. A. (2015). Happiness, excellence, and optimal human functioning revisited: Examining the peer-reviewed literature linked to positive psychology. *The Journal of Positive Psychology*, 10, 185-195. doi:10.1080/17439760.2014.943801
- Dowling, E. M., Gestsdottir, S., Anderson, P. M., von Eye, A., Almerigi, J., & Lerner, R. M. (2004). Structural relations among spirituality, religiosity, and thriving in adolescence. *Applied Developmental Science*, 8, 7-16.

doi:10.1207/S1532480XADS0801_2

- Dowling, E. M., Gestsdottir, S., Anderson, P. M., von Eye, A., & Lerner, R. M. (2003). Spirituality, religiosity, and thriving among adolescents: Identification and confirmation of factor structures. *Applied Developmental Science, 7*, 253-260. doi:10.1207/S1532480XADS0704_4
- Elice, C. E., & Fields, H. W. (1990). Failure to thrive: Review of the literature, case report and implications for dental treatment. *Pediatric Dentistry, 12*, 185-189.
- Emond, A., Drewett, R., Blair, P., & Emmett, P. (2007). Postnatal factors associated with failure to thrive in term infants in the Avon Longitudinal Study of Parents and Children. *Archives of Disease in Childhood, 92*, 115-119. doi:10.1136/ad.2005.091496
- Epel, E. S., McEwen, B. S., & Ickovics, J. R. (1998). Embodying psychological thriving: Physical thriving in response to stress. *Journal of Social Issues, 54*, 301-322. doi:10.1111/0022-4537.671998067
- Erikson, E. H. (1959). *Identity and the life cycle*. New York, NY: International Universities Press.
- Feeney, B. C., & Collins, N. L. (2015). A new look at social support: A theoretical perspective on thriving through relationships. *Personality and Social Psychology Review, 19*, 113-147. doi:10.1177/1088868314544222
- Flinchbaugh, C., Luth, M. T., & Li, P. (2015). A challenge or a hindrance? Understanding the effects of stressors and thriving on life satisfaction. *International Journal of Stress Management, 22*, 323-345. doi:10.1037/a0039136
- Fredrickson, B. L. (2006). Unpacking positive emotions: Investigating the seeds of human flourishing. *The Journal of Positive Psychology, 1*, 57-59. doi:10.1080/17439760500510981
- Fredrickson, B. L., & Losada, M. F. (2005). Positive affect and the complex dynamics of human flourishing. *American Psychologist, 60*, 678-686. doi:10.1037/0003-066x.60.7.678
- Gan, Y. Q., Xie, X. F., Wang, T., Rodriguez, M. A., & Tang, C. S. (2013). Thriving in the shadow of the 2008 Sichuan Earthquake: Two studies on resilience in adolescents. *Journal of Health Psychology, 18*, 1232-1241. doi:10.1177/1359105312459897

- Gestsdottir, S., Urban, J. B., Bowers, E. P., Lerner, J. V., & Lerner, R. M. (2011). Intentional self-regulation, ecological assets, and thriving in adolescence: A developmental systems model. *New Directions for Child and Adolescent Development*, 133, 61-76. doi:10.1002/cd.304
- Globerman, J., White, J. J., Mullings, D., & Davies, J. M. (2003). Thriving in program management environments: The case of social work in hospitals. *Social Work in Health Care*, 38, 1-18. doi:10.1300/J010v38n01_01
- Gucciardi, D. F., Hanton, S., Gordon, S., Mallett, C. J., & Temby, P. (2015). The concept of mental toughness: Tests of dimensionality, nomological network, and traitness. *Journal of Personality*, 83, 26-44. doi:10.1111/jopy.12079
- Hackman, J. R., & Oldham, G. (1980). *Work redesign*. Reading, MA: Addison-Wesley.
- Haynes, C. F., Cutler, C., Gray, J., & Kempe, R. S. (1984). Hospitalized cases of nonorganic failure to thrive: The scope of the problem and short-term lay health visitor intervention. *Child Abuse & Neglect*, 8, 229-242. doi:10.1016/0145-2134(84)90012-7
- Jackson, D., Firtko, A., & Edenborough, M. (2007). Personal resilience as a strategy for surviving and thriving in the face of workplace adversity: A literature review. *Journal of Advanced Nursing*, 60, 1-9. doi:10.1111/j.1365-2648.2007.04412.x
- Jackson, D., McDonald, G., & Wilkes, L. (2011). Thriving in the workplace: Learning from innovative practices. In M. McAllister & J. B. Lowe (Eds.), *The resilient nurse: Empowering your practice* (pp. 105-114). New York, NY: Springer Publishing Company.
- Jarrett, T. (2013). Warrior resilience and thriving (WRT): Rational emotive behavior therapy (REBT) as a resiliency and thriving foundation to prepare warriors and their families for combat deployment and posttraumatic growth in Operation Iraqi Freedom, 2005–2009. *Journal of Rational-Emotive & Cognitive-Behavior Therapy*, 31, 93-107. doi:10.1007/s10942-013-0163-2
- Jelicic, H., Bobek, D. L., Phelps, E., Lerner, R. M., & Lerner, J. V. (2007). Using positive youth development to predict contribution and risk behaviors in early adolescence: Findings from the first two waves of the 4-H study of positive youth development. *International Journal of Behavioral Development*, 31, 263-273. doi:10.1177/0165025407076439

- Kahn, W. A. (1990). Psychological conditions of personal engagement and disengagement at work. *Academy of Management Journal*, 33, 692-724. doi:10.2307/256287
- Kaplan, A. (1964). *The conduct of inquiry*. San Francisco, CA: Chandler Publishing Company.
- Keyes, C. L. M. (1998). Social well being. *Social Psychology Quarterly*, 61, 121-140. doi:10.2307/2787065
- Keyes, C. L. M. (2002). The mental health continuum: From languishing to flourishing in life. *Journal of Health and Social Behavior*, 43, 207-222. doi:10.2307/3090197
- Keyes, C. L. M. (2003). Complete mental health: An agenda for the 21st century. In J. Haidt (Ed.), *Flourishing* (pp. 293-312). Washington, DC: American Psychological Association.
- Keyes, C. L. M. (2007). Promoting and protecting mental health as flourishing: A complementary strategy for improving national mental health. *American Psychologist*, 62, 95-108. doi:10.1037/0003-066X.62.2.95
- Keyes, C. L. M., & Waterman, M. B. (2003). Dimensions of well-being and mental health in adulthood. In M. H. Bornstein, L. Davidson, C. L. M. Keyes, & K. A. Moore (Eds.), *Well-being: Positive development across the life course* (pp. 477-497). Mahwah, NJ: Lawrence Erlbaum Associates.
- King, P. E., Dowling, E. M., Mueller, R. A., White, K., Schultz, W., Osborn, P., . . . Scales, P. C. (2005). Thriving in adolescence: The voices of youth-serving practitioners, parents, and early and late adolescents. *Journal of Early Adolescence*, 25, 94-112. doi:10.1177/0272431604272459
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York, NY: Springer Publishing Company.
- Lerner, R. M. (2004). *Liberty: Thriving and civic engagement among America's youth*. Thousand Oaks, CA: Sage Publications.
- Lerner, R. M., Dowling, E. M., & Anderson, P. M. (2003). Positive youth development: Thriving as a basis of personhood and civil society. *Applied Developmental Science*, 7, 172-180. doi:10.1207/S1532480XADS0703_8
- Lerner, R. M., Lerner, J. V., Almerigi, J. B., Theokas, C., Phelps, E., Gestsdottir, S., . . . von Eye, A. (2005). Positive youth development, participation in community youth development programs, and community contributions of

- fifth-grade adolescents: Findings from the first wave of the 4-H study of positive youth development. *Journal of Early Adolescence*, 25, 17-71. doi:10.1177/0272431604272461
- Lerner, R. M., Lerner, J. V., & Benson, J. B. (2011). Positive youth development: Research and applications for promoting thriving in adolescence. *Advances in Child Development and Behavior*, 41, 1-17. doi:10.1016/B978-0-12-386492-5.00001-4
- Lerner, R. M., von Eye, A., Lerner, J. V., Lewin-Bizan, S., & Bowers, E. P. (2010). The meaning and measurement of thriving: A view of the issues. *Journal of Youth and Adolescence*, 39, 707-719. doi:10.1007/s10964-010-9531-8
- Levinson, D. J. (1986). A conception of adult development. *American Psychologist*, 41, 3-13. doi:10.1037/0003-066X.41.1.3
- Liu, J., & Bern-Klug, M. (2013). Nursing home social services directors who report thriving at work. *Journal of Gerontological Social Work*, 56, 127-145. doi:10.1080/01634372.2012.750255
- Maslow, A. H. (1965). Some basic propositions of a growth and self-actualization psychology. In G. Lindzey & L. Hall (Eds.), *Theories of personality: Primary sources and research* (pp. 307-316). New York, NY: Wiley.
- Melnyk, B., Kelly, S., Jacobson, D., Arcoleo, K., & Shaibi, G. (2014). Improving physical activity, mental health outcomes, and academic retention in college students with Freshman 5 to thrive: COPE/Healthy lifestyles. *Journal of the American Association of Nurse Practitioners*, 26, 314-322. doi:10.1002/2327-6924.12037
- Niessen, C., Sonnentag, S., & Sach, F. (2012). Thriving at work—A diary study. *Journal of Organizational Behavior*, 33, 468-487. doi:10.1002/Job.763
- O'Leary, V. E., & Ickovics, J. R. (1995). Resilience and thriving in response to challenge: An opportunity for a paradigm shift in women's health. *Women's Health*, 1, 121-142.
- Park, C. L. (1998). Stress-related growth and thriving through coping: The roles of personality and cognitive processes. *Journal of Social Issues*, 54, 267-277. doi:10.1111/0022-4537.651998065
- Park, C. L., Cohen, L. H., & Murch, R. (1996). Assessment and prediction of stress-related growth. *Journal of Personality*, 64, 71-105. doi:10.1111/j.1467-6494.1996.tb00815.x

- Paterson, T. A., Luthans, F., & Jeung, W. (2014). Thriving at work: Impact of psychological capital and supervisor support. *Journal of Organizational Behavior*, 35, 434-446. doi:10.1002/job.1907
- Poehlmann, J., & Fiese, B. H. (2001). Parent-infant interaction as a mediator of the relationship between neonatal risk status and 12-month cognitive development. *Infant Behavior and Development*, 24, 171-188. doi:10.1016/S0163-6383(01)00073-X
- Porath, C., Spreitzer, G., Gibson, C., & Garnett, F. G. (2012). Thriving at work: Toward its measurement, construct validation, and theoretical refinement. *Journal of Organizational Behavior*, 33, 250-275. doi:10.1002/Job.756
- Quested, E., & Duda, J. L. (2010). Exploring the social-environmental determinants of well- and ill-being in dancers: A test of basic needs theory. *Journal of Sport & Exercise Psychology*, 32, 39-60.
- Reinboth, M., Duda, J. L., & Ntoumanis, N. (2004). Dimensions of coaching behavior, need satisfaction, and the psychological and physical welfare of young athletes. *Motivation and Emotion*, 28, 297-313. doi:10.1023/B:MOEM.0000040156.81924.b8
- Robinson, S. L. (1996). Trust and breach of the psychological contract. *Administrative Science Quarterly*, 41, 574-599. doi:10.2307/2393868
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55, 68-78. doi:10.1037/0003-066X.55.1.68
- Ryan, R. M., & Deci, E. L. (2001). On happiness and human potentials: A review of research on hedonic and eudaimonic well-being. *Annual Review of Psychology*, 52, 141-166. doi:10.1146/annurev.psych.52.1.141
- Ryan, R. M., & Deci, E. L. (2002). An overview of self-determination theory: An organismic-dialectical perspective. In E. L. Deci & R. M. Ryan (Eds.), *Handbook of self-determination research* (pp. 3-33). Rochester, NY: University of Rochester Press.
- Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology*, 57, 1069-1081. doi:10.1037/0022-3514.57.6.1069
- Sarkar, M., & Fletcher, D. (2014). Ordinary magic, extraordinary performance: Psychological resilience and thriving in high achievers. *Sport, Exercise, and*

Performance Psychology, 3, 46-60. doi:10.1037/spy0000003

Scales, P. C., Benson, P. L., Leffert, N., & Blyth, D. A. (2000). Contribution of developmental assets to the prediction of thriving among adolescents.

Applied Developmental Science, 4, 27-46.

doi:10.1207/S1532480XADS0401_3

Scales, P. C., Benson, P. L., & Roehlkepartain, E. C. (2011). Adolescent thriving: The role of sparks, relationships, and empowerment. *Journal of Youth and Adolescence*, 40, 263-277. doi:10.1007/s10964-010-9578-6

Scheier, M. E., & Carver, C. S. (1987). Dispositional optimism and physical well-being: The influence of generalized outcome expectancies on health. *Journal of Personality*, 55, 169-210. doi:10.1111/j.1467-6494.1987.tb00434.x

Seligman, M. E. P., & Csikszentmihalyi, M. (Eds.). (2000a). Positive psychology [Special issue]. *American Psychologist*, 55(1).

Seligman, M. E. P., & Csikszentmihalyi, M. (2000b). Positive psychology: An introduction. *American Psychologist*, 55, 5-14. doi:10.1037/0003-066x.56.1.89

Sheldon, K. M. (2009). Providing the scientific backbone for positive psychology: A multi-level conception of human thriving. *Psihologijske Teme*, 18, 267-284.

Sheldon, K. M., & Krieger, L. S. (2007). Understanding the negative effects of legal education on law students: A longitudinal test of self-determination theory. *Personality and Social Psychology Bulletin*, 33, 883-897.

doi:10.1177/0146167207301014

Simpson, J. A., Weiner, E. S. C., Murray, J. A. H., & Burchfield, R. W. (Eds.). (1989). *The Oxford English dictionary* (2nd ed.). Oxford, UK: Clarendon Press.

Smith, L. H., & Barker, E. (2009). Exploring youth development with diverse children: Correlates of risk, health, and thriving behaviors. *Journal for Specialists in Pediatric Nursing*, 14, 12-21. doi:10.1111/j.1744-6155.2008.00164.x

Soanes, C., & Stevenson, A. (Eds.). (2005). *Oxford dictionary of English* (2nd ed.). Oxford, UK: Oxford University Press.

Spreitzer, G., & Porath, C. (2014). Self-determination as a nutriment for thriving: Building an integrative model of human growth at work. In M. Gagné (Ed.), *The Oxford handbook of work engagement, motivation, and self-*

- determination theory* (pp. 245-258). New York, NY: Oxford University Press.
- Spreitzer, G., Porath, C. L., & Gibson, C. B. (2012). Toward human sustainability: How to enable more thriving at work. *Organizational Dynamics*, 41, 155-162. doi:10.1016/j.orgdyn.2012.01.009
- Spreitzer, G., Sutcliffe, K., Dutton, J., Sonenshein, S., & Grant, A. M. (2005). A socially embedded model of thriving at work. *Organization Science*, 16, 537-549. doi:10.1287/orsc.1050.0153
- Su, R., Tay, L., & Diener, E. (2014). The development and validation of the comprehensive inventory of thriving (CIT) and the brief inventory of thriving (BIT). *Applied Psychology: Health and Well-Being*, 6, 251-279. doi:10.1111/aphw.12027
- Sumsion, J. (2004). Early childhood teachers' constructions of their resilience and thriving: A continuing investigation. *International Journal of Early Years Education*, 12, 275-290. doi:10.1080/0966976042000268735
- Tedeschi, R. G., & Calhoun, L. G. (1996). The posttraumatic growth inventory: Measuring the positive legacy of trauma. *Journal of Traumatic Stress*, 9, 455-471. doi:10.1007/BF02103658
- Theokas, C., Almerigi, J. B., Lerner, R. M., Dowling, E. M., Benson, P. L., Scales, P. C., & Von Eye, A. (2005). Conceptualizing and modeling individual and ecological asset components of thriving in early adolescence. *Journal of Early Adolescence*, 25, 113-143. doi:10.1177/0272431604272460
- Thompson, B., & Ravlin, E. (2016). Protective factors and risk factors: Shaping the emergence of dyadic resilience at work. *Organizational Psychology Review*. Advance online publication. doi:10.1177/2041386616652673
- Tomlinson, J. M., Feeney, B. C., & Van Vleet, M. (2016). A longitudinal investigation of relational catalyst support of goal strivings. *The Journal of Positive Psychology*, 11, 246-257. doi:10.1080/17439760.2015.1048815
- Tremethick, M. J. (1997). Thriving, not just surviving: The importance of social support among the elderly. *Journal of Psychosocial Nursing and Mental Health Services*, 35, 27-31.
- Wallace, J. C., Butts, M. M., Johnson, P. D., Stevens, F. G., & Smith, M. B. (2016). A multilevel model of employee innovation: Understanding the effects of regulatory focus, thriving, and employee involvement climate. *Journal of*

Management, 42, 982-1004. doi:10.1177/0149206313506462

Weine, S. M., Ware, N., Tugenberg, T., Hakizimana, L., Dahnweih, G., Currie, M., . . . Levin, E. (2013). Thriving, managing, and struggling: A mixed methods study of adolescent African refugees' psychosocial adjustment. *Adolescent Psychiatry*, 3, 72-81. doi:10.2174/2210676611303010013

Wright, C., & Birks, E. (2000). Risk factors for failure to thrive: A population-based survey. *Child: Care, Health and Development*, 26, 5-16. doi:10.1046/j.1365-2214.2000.00135.x


Closing Commentary

Within this Chapter, extant thriving literature has been reviewed and discussed, which has resulted in the development of an alternative conceptualization of human thriving to be used in future assessments of the construct. It is noted, however, that this conceptualization requires further examination in terms of its applicability and its utility in various settings. Also highlighted in this Chapter are a variety of enabler and process variables that may be pertinent to understanding how and why humans thrive. Collectively, the conceptualization and elucidated variables provide an initial foundation upon which thriving can be examined and explored in sport performers. Specifically, this platform will inform the measures used to assess sport performers' experiences of thriving in the studies presented in Chapters 3, 4, 5, and 6, and the selection of enabler and process variables to be considered alongside them.

Chapter 3. Thriving on Pressure: A Factor Mixture Analysis of Sport Performers' Responses to Competitive Sporting Encounters

Introductory Commentary

The conceptual debate and literature review presented in Chapter 2 identified few instances of thriving being investigated in sport performers. It is apparent, therefore, that little knowledge exists on the construct in this population and that a systematic programme of research is yet to be pursued in sport. Drawing on the conceptualization of thriving proposed in Chapter 2, the study presented in this Chapter examines sport performers' responses to competitive encounters with an aim of establishing whether distinct response patterns exist between sport performers who thrived and those who did not. This examination focuses both on the level and shape of functioning displayed by performers, and their perceptions of various potential enabler (e.g., resilient qualities, social support) and process (e.g., basic psychological needs satisfaction) variables. See Appendix One for a copy of the scales used.

This declaration concerns the article entitled:									
Thriving on Pressure: A Factor Mixture Analysis of Sport Performers' Responses to Competitive Sporting Encounters									
Publication status (tick one)									
draft manuscript	<input type="checkbox"/>	Submitted	<input type="checkbox"/>	In review	<input checked="" type="checkbox"/>	Accepted	<input type="checkbox"/>	Published	<input type="checkbox"/>
Publication details (reference)	Brown, D. J., Arnold, R., Standage, M., & Fletcher, D. (2017). <i>Thriving on pressure: A factor mixture analysis of sport performers' responses to competitive sporting encounters</i> . Manuscript submitted for publication.								
Candidate's contribution to the paper (detailed, and also given as a percentage).	<p>Formulation of ideas: The candidate was predominantly responsible for the conceptualization of the paper, the identification of variables for investigation, and the formulation of original hypotheses. Candidate contribution = 75%</p> <p>Design of methodology: The candidate considerably contributed to the design of methodology used in the study, the identification of suitable measures, and selection of data analysis techniques. Candidate contribution = 75%</p> <p>Experimental work: The candidate was responsible for the collection of all data in the study and for running all analyses. Candidate contribution = 95%</p> <p>Presentation of data in journal format: The candidate drafted the manuscript in its entirety and formatted it according to journal specifications. The remaining authors read revisions of the manuscript prior to submission and provided comments accordingly. Candidate contribution = 80%</p>								
Statement from Candidate	This paper reports on original research I conducted during the period of my Higher Degree by Research candidature.								
Signed							Date	24/04/2017	

Evidence of permission to use published paper: N/A.

Data access statement: To be provided following the acceptance of the manuscript in a journal.

3.1 Abstract

Although considerable research exists on performers' responses to sporting encounters, little is known about how athletes thrive. In the current study, we examined if distinct response patterns existed between sport performers who thrived in competitive encounters compared to those who did not. Participants were 535 sport performers (134 women; $M_{age} = 23.60$ years, $SD_{age} = 8.08$; $M_{competing} = 11.84$ years, $SD_{competing} = 7.11$). Results of factor mixture analysis supported a four-profile solution comprising a thriving group ($n = 146$), a low-functioning group ($n = 38$), and two groups characterized by scores marginally above ($n = 131$) and below ($n = 209$) the sample mean. Profile membership was found to be predicted by personal enablers (viz., resilient qualities, psychological skills use) and process variables (viz., basic psychological needs satisfaction and frustration). This examination of thriving in sport performers offers significant implications for research and practice.

3.2 Introduction

Sport performers often encounter various stressors as part of their involvement in competitive sport. Their ability to respond effectively to these demands is likely to dictate whether they thrive, manage, or succumb in competition (Sarkar & Fletcher, 2014b). Athletes can be considered to be thriving should they experience development and success, as indicated by a high-level of well-being and a perceived high-level of performance (cf. Brown, Arnold, Fletcher, & Standage, 2016; see Chapter 2). Interestingly, and despite an abundance of research demonstrating how athletes might respond to and cope with the pressures they encounter (see, e.g., Gaudreau, Nicholls, & Levy, 2010), little research exists on the factors that facilitate thriving in sport. This lack of empirical thriving-related research is surprising, especially given the importance of performance and well-being in sport psychology (Harmison, 2011), and of positive development and success in competitive sport (see, e.g., Hollings, Mallett, & Hume, 2014).

Part of the explanation for the absence of scientific inquiry on thriving in the sport setting may be attributed to a lack of consistency in its conceptualization. For example, while some authors utilize a state-based definition of the construct (e.g., Gucciardi, Jackson, Hodge, Anthony, & Brooke, 2015), others consider thriving analogous with stress-related growth (e.g., Galli & Reel, 2012), or fail to provide any elaboration for their use of the term (e.g., Turner et al., 2013). This lack of

conceptual clarity is not unique to the sports setting, yet symptomatic of the confusion apparent in the broader thriving literature. Indeed, researchers have espoused various conceptualizations with some adopting a definition that incorporates state-like components (e.g., a sense of learning; Spreitzer, Sutcliffe, Dutton, Sonenshein, & Grant, 2005) and others a process-based definition (e.g., Bundick, Yeager, King, & Damon, 2010). In an attempt to address these conceptual issues, Brown et al. (2016; see Chapter 2) synthesized existing interpretations of the construct and forwarded a conceptualization of human thriving that they considered to be more temporally and contextually robust than previous attempts. Specifically, they suggested thriving to represent “the joint experience of development and success, which can be realized through effective holistic functioning and observed through the experience of a high-level of well-being and a perceived high-level of performance” (Brown et al., in press, p. 22; see Chapter 2, p. 24).

The lack of conceptual clarity in the extant literature offers little understanding of what it means to thrive in sport. To begin this inquiry, a logical first step is to establish whether it is possible to identify sport performers who are thriving. Building upon the conceptual argument that thriving is precluded by holistic functioning (see, Brown et al., in press; see Chapter 2; Su, Tay, & Diener, 2014), one approach that could be used is to assess multiple indicators of functioning (see, e.g., Scales, Benson, Leffert, & Blyth, 2000), with individuals scoring highly across indicators considered to be thriving. Thus, within the context of a sporting encounter (e.g., a match or competition), functioning and thriving could be assessed using measures of subjective performance and well-being specific to that setting. Alongside establishing if performers thrive in competition, this approach could offer valuable insights into the other patterns of functioning that may be observed in athletes. That is, although sport performers may be anticipated to display a general tendency to be functioning at high (i.e., thriving), moderate, or low levels in competition, it may also be the case that distinct profiles exist (e.g., high on performance, low on well-being; low on performance, high on well-being). Developing an awareness of these patterns would offer a more complete understanding of the responses displayed by performers in competition.

Although thriving conceptualized as a combination of performance and well-being has yet to be specifically examined in sport, there have been investigations of thriving in other domains (e.g., positive youth development, work). Within this

literature, various psychosocial variables have been elucidated as influencing human thriving. Researchers have, for example, identified a collection of developmental assets that are believed to contribute to thriving in adolescent populations (Benson, Leffert, Scales, & Blyth, 1998). Additionally, features of the work environment and resources produced by workers as they complete tasks have been found to support thriving in employees (Spreitzer et al., 2005). In considering the extant literature, the breadth of variables observed as influencing thriving can be broadly separated into two groups: personal enablers and contextual enablers (Brown et al., 2016; see Chapter 2; see also, Carver, 1998; Spreitzer et al., 2005). Personal enablers (e.g., personal resilient qualities) are the attitudes, behaviours, and cognitions of an individual that help him or her thrive (cf. Park, 1998). Contextual enablers (e.g., social support) are the characteristics of the environment that foster task engagement, effective coping, and thriving (Carver, 1998). Personal and contextual enablers can be contextually and temporally dependent (cf. Bundick et al., 2010; Thoits, 1995), therefore it is necessary to identify variables that may be salient to thriving in sport performers. Further, and as the effect of these enablers on thriving may be either direct or indirect (Scales et al., 2000; Spreitzer & Porath, 2014), research is needed to better understand how a coherent set of process variables operate (e.g., appraisals of stressors, basic psychological need satisfaction).

Although thriving as a construct is yet to be specifically examined in sport, there have been investigations into some of the underpinning enabler and process variables in athletic populations. In terms of potential personal enablers, a growing body of literature supports an association between psychological resilience and the success of sport performers (see, e.g., Galli & Gonzalez, 2015; Rees et al., 2016). Fletcher and Sarkar's (2012) grounded theory of resilience may provide some insight, wherein it is suggested that an athlete's perceptions of resilient qualities influences his or her challenge appraisals and meta-cognitions (process variables) which, in turn, can promote the facilitative responses that precede optimal sport performance. Research conducted in sport has tended to focus solely on performance outcomes; therefore, work pertaining to the impact of resilience on subjective well-being is needed (Galli & Gonzalez, 2015). In addition to the resilient qualities held by sport performers, research has also highlighted various psychological skills (e.g., goal-setting, imagery) that are believed to assist with adaptive stress responses and relate to sporting success and well-being (see, e.g.,

Edwards & Edwards, 2012; Mahoney, Gabriel, & Perkins, 1987; Rees et al., 2016).

Turning to the contextual enablers and how these link to the proxies indexing thriving, perceptions of social support have been found to differ significantly between high and low performers (when determined by self-referenced performance; Boat & Taylor, 2015) and, when considered in combination with negative social interactions, have been shown to contribute to burnout and impaired well-being across the competitive season (DeFreese & Smith, 2014). In addition to the aforementioned direct effect of social support on the indicators of thriving, indirect effects have also been found with the effects of perceived social support on performance explained via the process variables of perceived control and subsequent challenge appraisal (Freeman & Rees, 2009). These indirect processes are in accordance with the transactional theory of stress and coping (Lazarus 1966; Lazarus & Folkman, 1984), within which individuals are proposed to appraise a situation as a challenge (i.e., the potential for gain or growth) when they perceive high levels of control and, as a result of these appraisals, experience effective coping and positive outcomes. Sport performers can also receive social support from their coach and this has previously been found to predict athletes' perceptions of autonomy, competence, and relatedness (Kipp & Weiss, 2013; Reinboth, Duda, & Ntoumanis, 2004). Satisfaction of these basic psychological needs may, therefore, be an additional process variable between social contexts and thriving, given the well established relationship between need satisfaction and well-being (e.g., Reinboth et al., 2004); however, future research is still required to confirm a relationship between needs satisfaction and athletic performance (cf. Standage, 2012). Within basic psychological needs theory (BPNT; Deci & Ryan, 2000), optimal human functioning including thriving, is predicated on (i) the satisfaction of the three basic needs for autonomy, competence, and relatedness; and (ii) need satisfaction is nurtured and maintained via environments that are need supportive. Similarly, and within BPNT, need frustration via controlling or need thwarting coaching environments will yield distinct functional costs, including impaired levels of thriving (cf. Bartholomew, Ntoumanis, Ryan, Bosch, & Thøgersen-Ntoumani, 2011).

To enable the identification of possible functioning profiles displayed by sport performers in the present study, it is necessary to integrate both person- and variable-centered approaches. Person-centered approaches (e.g., latent profile analysis) explain the covariance between individuals through a categorical latent

variable (Lubke & Muthén, 2005). In contrast, variable-centered approaches (e.g., confirmatory factor analysis) attempt to explain the covariance between variables using a continuous latent variable (Cattell, 1952). The purpose of person-centered approaches is to look for relationships between individuals, whereas variable-centered approaches are used to examine relationships between variables (Bauer & Curran, 2004). Within the present study, it is anticipated that distinct profiles may exist with some performers reporting high levels of well-being, but low levels of performance, and vice versa. To determine these so-called ‘*shape* effects’ (i.e., the tendency for a person to have a distinct pattern of factors on which they are high, medium, or low), it is appropriate to adopt person-centered techniques (see, Morin & Marsh, 2015). However, it is also anticipated that a global continuous variable (i.e., general functioning level) will underpin performers’ responses to the thriving indicators (i.e., performance and well-being); therefore, creating a *level* effect (i.e., the tendency for a person to be high, medium, or low across all factors) and the need to follow a variable-centered approach (see, Morin & Marsh, 2015). In order to disentangle the *level* and *shape* effects and enable the extraction of cleaner functioning profiles, factor mixture models stipulating a categorical latent variable and a profile-invariant continuous latent factor will be used (see, Lubke & Muthén, 2005). Furthermore, adopting this approach permits the examination of relationships between possible enabler and process variables with profile membership, through the inclusion of predictor variables (see, Asparouhov & Muthén, 2014).

Using these techniques, the aim of the present study was to examine whether it is possible to identify sport performers who thrive in competitive sporting encounters via the measurement of subjective performance and well-being. Furthermore, it was anticipated that through pursuit of this aim, it would be possible to identify the other patterns in functioning responses displayed by performers in these scenarios. A secondary aim of the study was to examine whether profile membership could be predicted from scores for personal enablers (e.g., resilient qualities), contextual enablers (e.g., social support), and underpinning process variables (e.g., basic psychological need satisfaction).

3.3 Method

3.3.1 Participants

Participants were 535 sport performers (401 male) aged between 16 and 62 ($M_{age} = 23.60$, $SD_{age} = 8.08$) years, with 91.2% reporting a British nationality. Team (e.g., field hockey, rugby union) and individual (e.g., tennis, track and field) sports were represented in the sample, with participants' average competitive experience being 11.84 years ($SD_{TimeCompeting} = 7.11$ years). The majority of performers (79.8%) reported taking part in senior (rather than junior) competitions, with 3.4% of the sample competing at an intracub level, 24.2% at a local level, 45.7% at a regional level, 21.9% at a national level, 3.7% at an international level, and 0.7% as a professional athlete.

3.3.2 Procedure

Following institutional ethical approval, participants were invited to participate in the study either through direct correspondence or via their coaches. During this initial contact, participant information sheets were distributed which summarized the purpose and nature of the study and the participants' ethical rights (e.g., anonymity, confidentiality, right to withdraw). For those participants who were aged 16 or 17 years, consent was initially obtained from coaches or teachers in loco parentis and then the sport performers were free to choose whether or not they completed the questionnaire. Participants aged 18 years or older were asked to personally provide informed consent prior to participating. After providing informed consent, participants were given a copy of a multi-section questionnaire, which was available in both written and electronic formats. The psychometric properties of all measures included in the questionnaire have previously been shown to be acceptable. When responding to the items, participants were asked to reflect on their experiences in competitive sporting encounters over the past month.

3.3.3 Measures

3.3.3.1 Functioning

Sport performers' functioning was assessed via indices of subjective performance and well-being (cf. Brown et al., in press; see Chapter 2). Subjective performance was determined by participants' satisfaction with their performance over the past month on an 11-point scale (0 = *totally dissatisfied*, 10 = *totally satisfied*) (cf. Pensgaard & Duda, 2003). In recognition of the differentiated approach to understanding well-being (Ryan, Huta, & Deci, 2013), separate measures were used to assess hedonic and eudaimonic well-being. The International

Positive and Negative Affect Schedule Short Form (I-PANAS-SF; Thompson, 2007) was used to assess positive affect as an indicator of hedonic well-being with participants indicating the extent to which they experienced five different emotional descriptors on a five-point Likert scale (1 = *never*, 5 = *always*). The Subjective Vitality Scale (SVS; Ryan & Frederick, 1997) was used to assess participants' aliveness and energy as an indicator of eudaimonic well-being with participants responding to four items from the SVS on a six-point scale (1 = *not at all true*, 6 = *very true*). Cronbach's alpha values for the positive affect and subjective vitality scales used in this study were .68 and .86 respectively. Results from a second-order confirmatory factor analysis for the proposed a-priori structure for functioning show good model fit to the data ($\chi^2(32) = 70.873$, $p < .001$, CFI = 0.97, RMSEA = 0.048 [90% CI 0.03, 0.06] $p = .557$) and second-order factor loadings of .81 (positive affect), .92 (subjective vitality), and .54 (subjective performance). Standardized values of the three functioning indicators were used in the subsequent analysis of the data.

3.3.3.2 Personal enablers

Participants were asked to reflect on their levels of two personal enablers over the past month: personal resilient qualities and psychological skills use. To assess personal resilient qualities, participants completed the autonomous values and beliefs, proactive personality, and robust confidence subscales from the Sport Resilience Scale (SRS; Sarkar, Fletcher, Stride, & Munir, 2016). Participants responded to the 10 items on a five-point scale (1 = *strongly disagree*, 5 = *strongly agree*). Cronbach's alpha for the total resilient qualities score in the present sample was .73. Participants' psychological skills use was assessed using a modified version of the Test of Performance Strategies (TOPS; Hardy, Roberts, Thomas, & Murphy, 2010), with items rephrased to encompass performers' general use of the strategies rather than practice or competition specific use. Participants responded to three-item subscales on a five-point Likert scale (0 = *never*, 4 = *always*) to indicate the extent to which they used activation, automaticity, emotional control, goal setting, imagery, negative thinking, relaxation, and self-talk psychological skills. The Cronbach's alpha value for psychological skill use was .81.

3.3.3.3 Contextual enablers

Participants evaluated the extent to which they perceived support from two

contextual enablers (viz., social support, needs supportive environment). The level of social support was evaluated using an adaptive version of the Perceived Available Support in Sport Questionnaire (PASS-Q; Freeman, Coffee, & Rees, 2011). The PASS-Q is a 16-item measure that assesses athletes' perceptions of the availability of emotional support, esteem support, informational support, and tangible support. In the current study, participants rated the extent to which someone provided each type of support to them on a 0 (*not at all*) to 4 (*extremely*) scale, and the internal consistency for the full scale was .93. Rocchi and colleagues' (2017) Interpersonal Behaviours Questionnaire (IBQ) was used to assess the extent to which the coach created a need supportive environment and a need thwarting environment. The IBQ asks sport performers to evaluate their coach's behaviour across 24 items on a seven-point scale (1 = *do not agree*, 7 = *completely agree*). The scale comprises six subscales that assess autonomy support, autonomy thwart, competence support, competence thwart, relatedness support, and relatedness thwart. Internal consistencies for the total coach support scale and total coach thwart scale were .93 and .90, respectively.

3.3.3.4 Process variables

To determine whether differences existed on potential thriving process variables, participants were asked to report their levels of challenge and threat appraisals, and need satisfaction and frustration over the past month. Challenge and threat appraisals were assessed using the two-item version of McGregor and Elliot's (2002) task construal measures. Participants responded to the four items on a 1 (*not at all true of me*) to 7 (*very true of me*) Likert scale. Internal consistencies of the scales in the present work were .84 for challenge and .90 for threat. The Basic Needs Satisfaction in Sport Scale (BNSSS; Ng, Lonsdale, & Hodge, 2011) was used to assess performers' levels of autonomy satisfaction (six items), competence satisfaction (five items), and relatedness satisfaction (five items). Need frustration was assessed using three-item subscales for autonomy frustration, competence frustration, and relatedness frustration from the Basic Psychological Needs Scale (BPNS; Chen et al., 2015). For all of the items, sport performers were asked to indicate how true the items were for them on a seven-point Likert scale (1 = *not at all true*, 7 = *very true*). The internal consistencies for the composite scores for need satisfaction and need frustration were .90 and .83, respectively.

3.3.4 Data Analysis

Analyses were conducted using SPSS 22 (IBM, 2013) and Mplus 7.4 (Muthén & Muthén, 2015a). SPSS 22 was used to screen data for missing values, unengaged responses, univariate and multivariate outliers, and to generate descriptive statistics and assess bivariate correlations. In accordance with Tabachnick and Fidell's (2013) recommendations, multivariate outliers were identified using Mahalanobis distance with $p < .001$. Variable-centered analyses (i.e., confirmatory factor analysis on functioning indices) were conducted using a structural equation modeling framework in Mplus 7.4, which also enabled the examination of correlations between the observed subjective performance item and the latent subjective vitality and positive affect constructs. Mplus was also used to perform factor mixture analysis (FMA); this approach was used in favor of the more traditional latent profile analysis (LPA) given the anticipated level and shape effects on the functioning profiles (see, Lubke & Muthén, 2005; Morin & Marsh, 2015). Factor mixture analysis uses common combinations of scores on continuous indicator variables (i.e., subjective vitality, positive affect, and subjective performance) to predict unmeasured profile membership, whilst also accounting for the correlations between the functioning indices through the inclusion of a profile-invariant continuous latent factor. Model parameters were estimated using a maximum likelihood estimation with robust standard errors (MLR) to account for any non-normality within the data and any missing values (cf. Muthén & Muthén, 2015b). Five thousand different sets of starting values were requested, 100 iterations for each random start, and the 200 starts that yielded the highest log-likelihood were retained for the final optimizations (Morin & Wang, 2016). As no prior knowledge existed for how many profiles would be represented in the functioning responses displayed by sport performers, models with one-six latent profiles were fit to the data, with intercepts and residuals freely estimated in all profiles. The best fitting and most parsimonious classification model was decided by the interpretability and theoretical meaningfulness of the profiles (see, e.g., Lindwall, Weman-Josefsson, Sebire, & Standage, 2016), and determined using the Bayesian information criterion (BIC; Schwartz, 1978), sample-size adjusted BIC, and the Lo-Mendell-Rubin likelihood ratio test (LMR; Lo, Mendell, & Rubin, 2001). Lower values of the BIC and sample-size adjusted BIC indicated better model fit, and LMR was used to test whether the k -profile model was a significantly better fit to the data compared to the

$k-1$ -profile model. Estimated posterior probabilities and entropy statistics were used to determine the reliability of the profile classifications with scores closest to 1 reflecting greater classification accuracy (Pastor, Barron, Miller, & Davis, 2007). To examine whether profile membership could be predicted from the enablers (viz., resilient qualities, psychological skills use, need supportive and thwarting environment, social support) and processes (viz., basic psychological need satisfaction and frustration, challenge and threat appraisal), the nine variables were included as auxiliary variables in the best fitting FMA model using a three-step approach (see, Asparouhov & Muthén, 2014). To aid reader interpretation, odds ratios were computed from the regression coefficients and reflect the change in the likelihood of membership in a target profile in contrast to a comparison profile associated with each unit of increase in the predictor.

3.4 Results

Questionnaire responses were screened for case-wise missing data and unengaged responses, which resulted in the data from six participants being removed. In addition, five multivariate outliers were identified and removed, leaving a final analytical sample size of 524. Descriptive statistics and correlations between the functioning indices, enablers, and process variables are presented in Table 3.1.

3.4.1 Factor Mixture Analysis

The BICs and sample-size adjusted BICs for the models are displayed in Table 3.2. The lowest BIC was associated with the four-profile model, whereas the sample-sized adjusted BICs were found to continually decrease following the inclusion of additional profiles. The LMR value for the five-profile model was non-significant ($p = .14$), suggesting that the fifth profile in this model was not distinct from the other profiles and, therefore, supporting the retention of a four-profile model. When considered in relation to the most likely latent profile membership, the four profiles derived from the model each accounted for a substantial proportion of the sample (range 7.25% - 39.89%) and the model showed high classification accuracy with the average within-profile posterior probability being .90 (range .85 to .93). The classification accuracy for the four-profile model was also supported by the class proportions determined using the estimated posterior probabilities (all class proportions > 8.8%) and the entropy statistic (entropy = .82). The three, four, and five profile solutions were closely inspected and compared independently by the

study authors to examine their substantive and theoretical meaningfulness. The four-profile model was deemed to be the most parsimonious and theoretical meaningful solution, and was therefore retained in the subsequent analysis.

3.4.2 Interpretation of the Four-Profile Solution

Standardized scores for the functioning indices were used to interpret the best fitting model and these are presented in Table 3.3 and displayed graphically in Figure 3.1. Profile 1 (“thriving”) represents 27.9% ($n = 146$, based on most likely latent profile membership) of participants and includes individuals who displayed the most effective functioning under competitive pressure. In this group, sport performers reported the highest levels of subjective vitality, positive affect, and subjective performance. Profile 2 (“above average”; 25.0% of participants, $n = 131$) has mean scores marginally above the sample mean. Interestingly, inspection of the 90% confidence intervals in Figure 3.1 suggests that subjective performance scores in the above average and thriving profiles, may not be significantly different. Profile 3 (“below average”) represents 39.9% ($n = 209$) of the sport performers and has subjective vitality, positive affect, and subjective performance scores marginally below the sample mean. Profile 4 (“low functioning”) is the smallest profile representing 7.3% ($n = 38$) of the sport performers. These individuals have mean scores well below the sample mean and are those who functioned least well under the competitive pressure encountered.

3.4.3 Prediction of Latent Profiles from Enabler and Process Variables

Regression coefficients and odds ratios (ORs) for the relationships among the nine predictor variables (five enablers, four process variables) and the categorical latent class variable are presented in Table 3.4, with profile 1 (“thriving”) as the comparison profile. The results from this analysis show that possessing higher levels of resilient qualities significantly decreases the likelihood of membership to profiles 2 (“above average”; 0.503) and 3 (“below average”; OR = 0.433) compared to membership in the thriving profile. Furthermore, reporting greater use of psychological skills was found to significantly decrease the likelihood of membership to profile 4 (“low functioning”; OR = 0.448) compared to the thriving profile. The results from the process variables suggest that, when perceiving a high level of basic psychological need satisfaction, the likelihoods of membership to all other profiles are significantly lower compared to the thriving profile (above

Table 3.1 *Descriptive Statistics and Correlations between Functioning Indices, Enablers, and Process Variables*

	<i>M</i>	<i>SD</i>	1	2	3
<i>Functioning</i>					
1 Subjective vitality (1 – 6)	4.80	.76	—		
2 Positive affect (1 – 5)	4.13	.46	.75*	—	
3 Subjective performance (0 – 10)	6.66	1.72	.50*	.44*	—
<i>Enablers</i>					
Resilient qualities (10 – 50)	39.37	4.40	.43*	.39*	.32*
Psychological skills use (0 – 94)	55.17	10.35	.35*	.38*	.28*
Social support (0 – 4)	2.50	.77	.22*	.26*	.16*
Coach needs supportive behaviors (1 – 7)	4.98	1.17	.31*	.31*	.23*
Coach needs thwarting behaviors (1 – 7)	2.44	1.02	-.21*	-.19*	-.20*
<i>Process Variables</i>					
Challenge appraisal (2 – 14)	11.41	2.15	.38*	.36*	.28*
Threat appraisal (2 – 14)	4.66	2.45	-.22*	-.20*	-.23*
Basic psychological need satisfaction (1 – 7)	5.56	.73	.44*	.47*	.42*
Basic psychological need frustration (1 – 7)	2.78	.98	-.36*	-.27*	-.37*

Note. The range for scores on each of the variables are indicated in parentheses. Mean values for indices, enabler, and process variables are scale means. Correlations between functioning indices based on the single-item subjective performance variable, and the subjective vitality and positive affect latent constructs (using structural equation modelling). Correlations between indices, enablers, and process variables assessed using Spearman's correlation in SPSS.

* $p < .001$.

Table 3.2 *Fit Indices, Entropy, and Model Comparisons for Estimated Factor Mixture Models*

Model	LL	#fp	Scaling	BIC	SSA-BIC	Entropy	LMR
1 profile	-2024.466	9	1.3464	4105.284	4076.716	—	—
2 profile	-1955.135	16	1.1663	4010.454	3959.667	.651	< .001
3 profile	-1860.214	23	1.1227	3864.441	3791.434	.866	< .001
4 profile	-1812.842	30	1.1664	3813.530	3718.302	.823	.006
5 profile ^a	-1795.407	37	1.1768	3822.490	3705.043	.832	.14
6 profile ^b	-1784.323	44	0.0112	3844.152	3704.485	.851	< .001

Note. LL = model log-likelihood; #fp = number of free parameters; scaling = scaling factor associated with MLR log-likelihood estimator; BIC = Bayesian information criteria; SSA-BIC = sample size-adjusted BIC; LMR = *p* value for Adjusted Lo-Mendell-Rubin likelihood ratio test.

^aA negative residual variance was returned for ZPA in latent profile 4. This suggests that the model converged on an improper solution, possibly due to overparameterization in the number of latent profile requested or allowing too many parameters to differ over profiles (Chen, Bollen, Paxton, Curran, & Kirby, 2001). Hence, more parsimonious models may be superior. ^bOne or more parameters were fixed to avoid singularity of the information matrix. A number of negative residual variances were returned, therefore more parsimonious models may be superior.

Table 3.3 *Description of the Four Latent Profiles based on Standardized Functioning Index Scores*

Functioning variables	Profile 1	Profile 2	Profile 3	Profile 4
Positive affect	.762***	.120	-.252*	-1.495***
Subjective vitality	1.130***	.125***	-.455**	-1.702***
Subjective performance	.539***	.363***	-.238*	-1.558***

Note. Profile 1 ($n = 146$, 27.9%) = thriving; Profile 2 ($n = 131$, 25.0%) = above average. Profile 3 ($n = 209$, 39.9%) = below average; Profile 4 ($n = 38$, 7.3%) = low functioning; Counts based on participants' most likely latent profile membership.

* $p < .05$, ** $p < .01$ *** $p < .001$

Table 3.4 Results from the Multinomial Logistic Regressions for the Effects of Enabler and Process Variables on Functioning Profile Membership

	Latent profile 2 vs. 1		Latent profile 3 vs. 1		Latent profile 4 vs. 1	
	Coef. (SE)	OR	Coef. (SE)	OR	Coef. (SE)	OR
<i>Enablers</i>						
Resilient qualities	-.688 (.230)**	0.503	-.835 (.243)**	0.433	-.591 (.366)	0.554
Psychological skills use	-.148 (.187)	0.862	-.179 (.205)	0.836	-.804 (.380)*	0.448
Social support	.075 (.195)	1.078	.108 (.228)	1.114	-.175 (.320)	0.839
Coach needs support	-.107 (.250)	0.899	.060 (.267)	1.062	-.036 (.412)	0.965
Coach needs thwart	-.363 (.246)	0.696	-.085 (.271)	0.919	.056 (.449)	1.058
<i>Processes</i>						
Challenge appraisal	.140 (.234)	1.150	-.261 (.251)	0.770	-.645 (.382)	0.525
Threat appraisal	-.224 (.187)	0.799	-.311 (.189)	0.733	.261 (.370)	1.298
Basic psychological need satisfaction	-.842 (.293)**	0.431	-.948 (.312)**	0.348	-1.616 (.437)***	0.199
Basic psychological need frustration	.180 (.269)	1.197	.723 (.244)**	2.060	.111 (.442)	1.117

Note. Calculations based on the Factor Mixture Model with 4 classes ($N = 456$). Odds ratios below 1 correspond to a negative logistic regression coefficient and suggest that the likelihood of membership in the target profile is reduced. Ratios over 1 suggest the likelihood of membership in the target profile is increased. Coef. = regression coefficient; SE = standard error; OR = odds ratio.

* $p < .05$, ** $p < .01$, *** $p < .001$

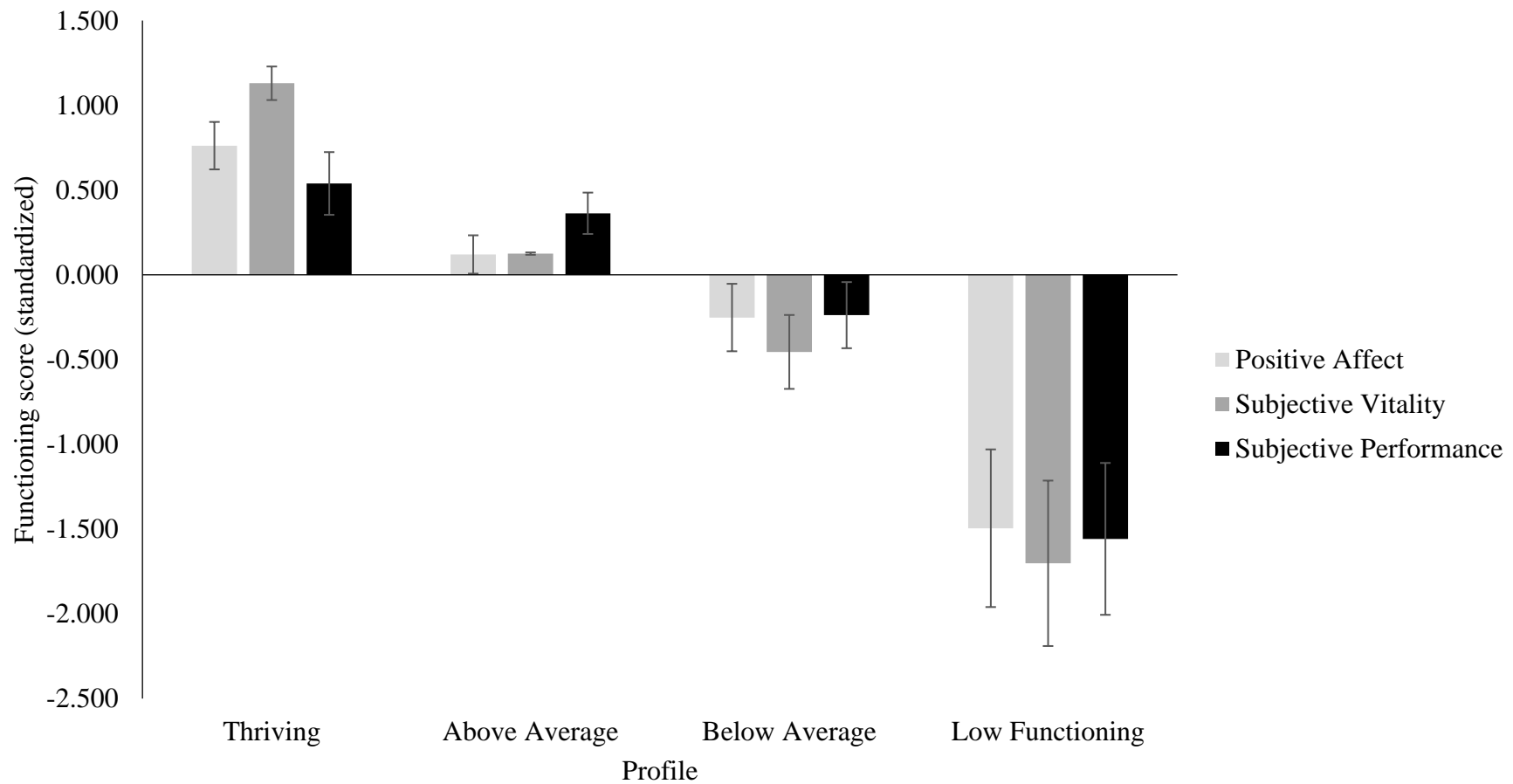


Figure 3.1 Factor mixture analysis solutions for the four-profile model.
Error bars = 90% confidence intervals.

average, OR = 0.431; below average, OR = 0.348; low functioning, OR = 0.199). In addition, perceiving higher levels of basic psychological need frustration was found to significantly increase the likelihood of membership to the below average profile compared to the thriving profile (OR = 2.060). All other regression coefficients were non-significant.

3.5 Discussion

Understanding what differentiates and characterizes individuals who thrive in competition from those who do not can provide critical theoretical and applied insight. Couched within a proposed conceptualization of thriving (cf. Brown et al., in press; see Chapter 2), the purpose of the current study was to investigate whether it was possible to identify sport performers who thrived in competitive sporting encounters, the functioning profiles of those who did not, and to establish whether profile membership could be predicted from scores for personal enablers, contextual enablers, and process variables. Using a person- and variable-centred approach, four classes of functioning were identified: high functioning (i.e., thriving), low functioning, and two types of functioning characterized by scores marginally above and below the mean. Furthermore, profile membership was found to be predicted by personal resilient qualities and psychological skills use, and basic psychological need satisfaction and frustration process variables.

The identification of a thriving profile of sport performers in this study supports the notion that humans can achieve a state of optimal functioning whilst encountering demands, and that it is possible to differentiate between individuals who thrive, and those who do not (Brown et al., in press; see Chapter 2; see also, Sarkar & Fletcher, 2014a). Further, the identification of three additional profiles with quantitative differences contributes significantly to an understanding of how sport performers function in competitive sporting encounters and adds greater depth to the existing methods used for assessing thriving (see, e.g., Porath, Spreitzer, Gibson, & Garnett, 2012). To elaborate, whilst Porath et al. (2012) consider thriving on a high-low continuum, the findings in the present study suggest that a broader continuum of functioning responses exists with thriving appearing at the top of this scale. Furthermore, the analysis established the validity of using subjective performance, subjective vitality, and positive affect as proxies for functioning in sport, with the shared variance amongst these variables accounted for by a higher,

latent “functioning” construct. To our knowledge, this represents the first time that functioning has been modeled in this way with previous sport and thriving research tending to examine performance and well-being as separate outcome variables (see, e.g., Carpentier & Mageau, 2013; Porath et al., 2012). This multifaceted approach therefore offers a novel option for assessing human functioning and thriving in future research.

Notwithstanding the quantitative differences between profiles indicating a *level* effect for a general functioning factor, no clear qualitative variations emerged (i.e., none of the profiles displayed asynchronous patterns on the functioning indices). This finding suggests that performers’ perceptions of in-game performance, vitality, and positive affect are linked in valence and magnitude. To illustrate, individuals who perceive low levels of positive affect, were also found to report similarly low levels of vitality and performance. Consequently, this finding offers statistical support to previous qualitative work wherein thriving in sport has been recognized to include performance, hedonic well-being, and eudaimonic well-being components (see, Brown, Arnold, Reid, & Roberts, 2017), and studies which have identified relationships between performance and well-being (see, e.g., Ford, Cerasoli, Higgins, & Decesare, 2011). However, it challenges the suggestion that the prediction of well-being (i.e., positive affect, vitality) and performance can lead to differentiated results; that is, the significant prediction of one functioning index but not another (see, e.g., Mouratidis, Vansteenkiste, Lens, & Sideridis, 2008; Sheldon & Filak, 2008). In addition, the lack of asynchronous profiles, despite controlling for an overarching functioning latent factor, suggests that covariance in the model was due to relationships between variables, and that no heterogeneity could be attributed to the presence of subpopulations within the sample (cf. Lubke & Muthén, 2005). Within future work, therefore, it may be appropriate to adopt variable-centered methodologies (Morin & Marsh, 2015).

A secondary aim of the study was to establish whether profile membership could be predicted by personal and contextual enablers, and process variables. Results pertaining to the personal enablers revealed significant prediction of profile membership. To elaborate, possessing high levels of personal resilient qualities was found to decrease the likelihood of membership to above average and below average functioning profiles in comparison to the thriving profile. Although not statistically significant, a similar decreased likelihood trend emerged for the low functioning

group (see Table 3.4). Establishing resilient qualities as a significant predictor of functioning profile (as indexed using a combined performance and well-being score), extends previous literatures that have espoused relationships between resilient qualities and performance (e.g., Fletcher & Sarkar, 2012) and well-being (e.g., Hosseini & Besharat, 2010) separately. These findings also offer the first statistical evidence from the sport literature to substantiate a relationship between resilience and thriving (see, Carver, 1998; Sarkar & Fletcher, 2014a). The second personal enabler considered in the present study, use of psychological skills, was found to significantly decrease the likelihood of membership to the low functioning profile compared to thriving; no prediction effect was found for membership to the above and below average profiles. Identifying that psychological skills use can be used to predict membership to thriving versus low functioning profiles supports previous findings suggesting that mental skills use is associated with enhanced performance and well-being (e.g., Boat & Taylor, 2015; Edwards & Edwards, 2012). However, the inability of scores on the use of psychological skills to differentiate between the likelihood of membership to above and below average profiles when compared to the thriving profile, challenges the utility of this enabler as a predictor across all functioning responses.

In contrast to the findings for personal enablers, social support, coach needs support, and coach needs thwart contextual factors did not predict the likelihood of profile membership (see Table 3.4). This finding is divergent to extant work in sport that has found relationships between social support and the separate functioning indices (e.g., Boat & Taylor, 2015; DeFreese & Smith, 2014), and between coach behaviors and dimensions of thriving (e.g., Gucciardi, Stamatis, & Ntoumanis, 2017). A possible explanation for the opposing findings in the present study to those previously reported, is the choice of outcome variables. Within the present study, functioning was determined using measures of performance and well-being, with thriving considered to represent a state of holistic functioning whereby performers would score highly for all functioning measures (cf. Brown et al., in press; see Chapter 2; Su et al., 2014). In contrast, Gucciardi et al. (2017) assessed thriving using an adaptive version of the thriving at work scale (Porath et al., 2012), wherein thriving is represented by the dimensions of vitality and learning. A notable difference in these approaches, therefore, is that the thriving at work scale restricts assessment to scales of well-being/development, whereas the method of assessing

thriving in the present study encompasses measures for both success and development (Brown et al., in press; see Chapter 2). Consequently, although coach needs thwarting behaviors may preclude development if these variables are considered in isolation, the results from the present study found no evidence to suggest that these behaviors can predict profile membership when functioning, and thriving, are assessed using well-being *and* performance.

An alternative explanation for the lack of predictive effect for the contextual enablers on functioning profile membership, may be the simultaneous inclusion of process variables in the analysis. To elaborate, the role of social agents in facilitating thriving following life adversity and life opportunity has previously been suggested to result in a selection of intermediate outcomes (e.g., altered appraisal, enhanced motivational state), prior to long-term thriving (Feeney & Collins, 2015). Thus, it may have been the case that the stress appraisals or basic psychological need variables included in the present study mediated any effects of the contextual enablers on performance and well-being. In support of this suggestion, significant predictive effects were found for the basic psychological need satisfaction and frustration variables on the likelihood of profile membership (see Table 3.4). Observing that significantly greater levels of need satisfaction predicted sport performers' membership in the thriving profile adds support to the tenets within BPNT and a growing body of literature that considers basic psychological need satisfaction to be essential for human growth and thriving (see, Ryan & Deci, 2017; Spreitzer & Porath, 2014). Equally supportive of BPNT, higher levels of basic need frustration significantly predicted the likelihood of sport performers' membership to the below average profile, in comparison to the thriving profile. Such a finding further supports the role of basic needs in differentially predicting thriving and is consistent with previous research (see, e.g., Vansteenkiste & Ryan, 2013). No predictive effects were observed for challenge and threat appraisal. The lack of relationship between stress appraisals and functioning profiles contrasts previous theoretical suggestions linking challenge appraisal to thriving (see, Carver, 1998), and empirical research that has examined the potential mediating role that appraisal plays in facilitating performance (see, Fletcher & Sarkar, 2012; Freeman & Rees, 2009).

The results from this work have a number of potential implications for applied practice. First, based on the findings, practitioners wanting to facilitate

thriving in sport are advised to explore methods for promoting personal enablers and process variables. In this venture, lessons could be taken from alternative performance domains where, for example, military personnel have participated in resilience training (Reivich, Seligman, McBride, 2011; see also, Schinke & Jerome, 2002) and employees have been exposed to performance feedback and decision-making discretion interventions to enhance need support and promote need satisfaction (Spreitzer, Porath, & Gibson, 2012; see also, Mageau & Vallerand, 2003). Second, to facilitate holistic functioning and enable athletes to thrive, it is suggested that practitioners consider evidence-informed strategies that can influence both performance and well-being (e.g., Barker, Jones, & Greenlees, 2010; Weinberg, Seabourne, & Jackson, 1981), as all indices assessed in the current study were shown to underpin sport performers' functioning responses. When devising and evaluating such complex interventions, it would be beneficial for researchers to follow published guidelines (see, e.g., Craig et al., n.d.), to ensure that the interventions achieve both intervention effectiveness (i.e., real-world utility) and intervention efficacy (i.e., rigorously examined) for the target outcomes (see, American Psychological Association Presidential Task Force on Evidence-Based Practice, 2006; Rumbold, Fletcher, & Daniels, 2012).

A notable strength of the current study is the use of factor mixture analysis, rather than more traditional class enumeration methods. This is for several reasons: factor mixture analysis allows for the inclusion of a profile invariant latent variable to control for correlations between indicators; fit indices are produced that enable comparison between models to ensure that the best fitting model is selected; the identification of profiles in factor mixture analysis is not biased towards creating classes of equal size; and factor mixture analysis provides posterior probabilities, recognizing that uncertainty exists about a participant's profile membership (Lubke & Muthén, 2005; Morin & Marsh, 2015). This analysis, however, only examined differences between sport performers at one time-point; therefore, longitudinal methods are needed to ascertain whether class membership is stable over the course of a season and if long-term patterns of functioning exist (see, e.g., Louvet, Gaudreau, Menaut, Genty, & Deneuve, 2007; Martinent & Nicolas, 2016). Further, all data for the current study were collected in the same, multi-section survey and common method bias may exist (Podsakoff, MacKenzie, & Podsakoff, 2012). To reduce potential bias, future research could employ a mixed-methods approach

whereby data are collected from different information sources (e.g., objective and subjective data, quantitative and qualitative data); this would also enable a more comprehensive understanding of sport performers' functioning responses to be obtained. Additional limitations of the current study are the unequal gender split of the sample (75% male) and the high proportion of sport performers with the same nationality (91% British). Although the latter sample characteristic can be explained by the fact that the research was conducted in the United Kingdom, the former gender split was unexpected and unintentional. The high numbers of male sport performers sampled (in comparison to females) have previously been noted within the sport psychology intervention literature (see, Brown & Fletcher, 2017), and it may therefore be of value for future inquiry to explore why this trend occurs, its implications for the generalizability of conclusions drawn and, if necessary, potential strategies to alleviate gender biased sampling (cf. Cuddeback, Wilson, Orme, & Combs-Orme, 2004; Ellenberg, 1994).

To conclude, the purpose of the present study was to examine if it was possible to identify sport performers who thrived in competitive sporting encounters, the functioning profiles of those who did not, and to establish whether profile membership could be predicted from scores for personal enablers, contextual enablers, and process variables. Factor mixture analysis revealed four novel profiles of functioning including a high functioning (thriving) group, a low functioning group, and two groups with functioning levels slightly above and below the mean. Profile membership was found to be predicted by personal resilient qualities and psychological skills use enabler variables, and basic psychological need satisfaction and frustration process variables; thus providing original insight that sport performers' perceived levels on these variables can facilitate thriving. The present study advances extant literature through the introduction of a holistic approach to examine thriving in competition, and by providing suggestions of pertinent variables for the facilitation of thriving that may be used to inform the development of thriving interventions.

3.6 Reference List

- American Psychological Association Presidential Task Force on Evidence-Based Practice. (2006). Evidence-based practice in psychology. *American Psychologist*, 61, 271-285. doi:10.1037/0003-066X.61.4.271
- Asparouhov, T., & Muthén, B. (2014). Auxiliary variables in mixture modeling: Three-step approaches using Mplus. *Structural Equation Modeling: A Multidisciplinary Journal*, 21, 329-341. doi:10.1080/10705511.2014.915181
- Barker, J. B., Jones, M. V., & Greenlees, I. (2010). Assessing the immediate and maintained effects of hypnosis on self-efficacy and soccer wall-volley performance. *Journal of Sport & Exercise Psychology*, 32, 243-252.
- Bartholomew, K. J., Ntoumanis, N., Ryan, R. M., Bosch, J. A., & Thøgersen-Ntoumani, C. (2011). Self-determination theory and diminished functioning: The role of interpersonal control and psychological need thwarting. *Personality and Social Psychology Bulletin*, 37, 1459-1473. doi:10.1177/0146167211413125
- Bauer, D. J., & Curran, P. J. (2004). The integration of continuous and discrete latent variable models: Potential problems and promising opportunities. *Psychological Methods*, 9, 3-29. doi:10.1037/1082-989X.9.1.3
- Benson, P. L., Leffert, N., Scales, P. C., & Blyth, D. A. (1998). Beyond the "village" rhetoric: Creating healthy communities for children and adolescents. *Applied Developmental Science*, 2, 138-159. doi:10.1207/s1532480xads0203_3
- Boat, R., & Taylor, I. M. (2015). Patterns of change in psychological variables leading up to competition in superior versus inferior performers. *Journal of Sport & Exercise Psychology*, 37, 244-256. doi:10.1123/jsep.2014-0216
- Brown, D. J., Arnold, R., Fletcher, D., & Standage, M. (in press). Human thriving: A conceptual debate and literature review. *European Psychologist*.
- Brown, D. J., Arnold, R., Reid, T., & Roberts, G. (2017). *A qualitative exploration of thriving in elite sport*. Manuscript submitted for publication.
- Brown, D. J., & Fletcher, D. (2017). Effects of psychological and psychosocial interventions on sport performance: A meta-analysis. *Sports Medicine*, 41, 77-99. doi:10.1007/s40279-016-0552-7
- Bundick, M. J., Yeager, D. S., King, P. E., & Damon, W. (2010). Thriving across the life span. In R. M. Lerner, M. E. Lamb, & A. M. Freund (Eds.), *The*

- handbook of life-span development* (pp. 882-923). Hoboken, NJ: John Wiley & Sons, Inc.
- Carpentier, J., & Mageau, G. A. (2013). When change-oriented feedback enhances motivation, well-being and performance: A look at autonomy-supportive feedback in sport. *Psychology of Sport and Exercise, 14*, 423-435. doi:10.1016/j.psychsport.2013.01.003
- Carver, C. S. (1998). Resilience and thriving: Issues, models, and linkages. *Journal of Social Issues, 54*, 245-266. doi:10.1111/0022-4537.641998064
- Cattell, R. B. (1952). The three basic factor-analytic research designs—their interrelations and derivatives. *Psychological Bulletin, 49*, 499-520. doi:10.1037/h0054245
- Chen, B. W., Vansteenkiste, M., Beyers, W., Boone, L., Deci, E. L., Van der Kaap-Deeder, J., . . . Verstuyf, J. (2015). Basic psychological need satisfaction, need frustration, and need strength across four cultures. *Motivation and Emotion, 39*, 216-236. doi:10.1007/s11031-014-9450-1
- Chen, F., Bollen, K. A., Paxton, P., Curran, P. J., & Kirby, J. B. (2001). Improper solutions in structural equation models. *Sociological Methods & Research, 29*, 468-508. doi:10.1177/0049124101029004003
- Cohen, J. (1998). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.
- Craig, P., Dieppe, P., Macintyre, S., Michie, S., Nazareth, I., & Petticrew, M. (Eds.). (n.d.). *Developing and evaluating complex interventions: New guidance*. Retrieved from <http://www.mrc.ac.uk/documents/pdf/complex-interventions-guidance/>
- Cuddeback, G., Wilson, E., Orme, J. G., & Combs-Orme, T. (2004). Detecting and statistically correcting sample selection bias. *Journal of Social Service Research, 30*, 19-33. doi:10.1300/J079v30n03_02
- Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11*, 227-268. doi:10.1207/S15327965PLI1104_01
- DeFreese, J. D., & Smith, A. L. (2014). Athlete social support, negative social interactions, and psychological health across a competitive sport season. *Journal of Sport & Exercise Psychology, 36*, 619-630. doi:10.1123/jsep.2014-0040

- Edwards, D. J., & Edwards, S. D. (2012). The evaluation of a psychological skills training programme for rugby players. *African Journal for Physical, Health Education, Recreation & Dance*, 18, 525-534.
- Ellenberg, J. H. (1994). Selection bias in observational and experimental studies. *Statistics in Medicine*, 13, 557-567. doi:10.1002/sim.4780130518
- Feeney, B. C., & Collins, N. L. (2015). A new look at social support: A theoretical perspective on thriving through relationships. *Personality and Social Psychology Review*, 19, 113-147. doi:10.1177/1088868314544222
- Fletcher, D., & Sarkar, M. (2012). A grounded theory of psychological resilience in Olympic champions. *Psychology of Sport and Exercise*, 13, 669-678. doi:10.1016/j.psychsport.2012.04.007
- Ford, M. T., Cerasoli, C. P., Higgins, J. A., & Decesare, A. L. (2011). Relationships between psychological, physical, and behavioural health and work performance: A review and meta-analysis. *Work & Stress: An International Journal of Work, Health & Organisations*, 25, 185-204. doi:10.1080/02678373.2011.609035
- Freeman, P., Coffee, P., & Rees, T. (2011). The PASS-Q: The Perceived Available Support in Sport Questionnaire. *Journal of Sport & Exercise Psychology*, 33, 54-74.
- Freeman, P., & Rees, T. (2009). How does perceived support lead to better performance? An examination of potential mechanisms. *Journal of Applied Sport Psychology*, 21, 429-441. doi:10.1080/10413200903222913
- Galli, N., & Gonzalez, S. P. (2015). Psychological resilience in sport: A review of the literature and implications for research and practice. *International Journal of Sport and Exercise Psychology*, 13, 1-15. doi:10.1080/1612197X.2014.946947
- Galli, N., & Reel, J. J. (2012). 'It was hard, but it was good': A qualitative exploration of stress-related growth in Division I intercollegiate athletes. *Qualitative Research in Sport, Exercise and Health*, 4, 297-319. doi:10.1080/2159676X.2012.693524
- Gaudreau, P., Nicholls, A., & Levy, A. R. (2010). The ups and downs of coping and sport achievement: An episodic process analysis of within-person associations. *Journal of Sport & Exercise Psychology*, 32, 298-311.
- Gucciardi, D. F., Jackson, B., Hodge, K., Anthony, D. R., & Brooke, L. E. (2015).

- Implicit theories of mental toughness: Relations with cognitive, motivational, and behavioral correlates. *Sport, Exercise, and Performance Psychology*, 4, 100-112. doi:10.1037/spy0000024
- Gucciardi, D. F., Stamatis, A., & Ntoumanis, N. (2017). Controlling coaching and athlete thriving in elite adolescent netballers: The buffering effect of athletes' mental toughness. *Journal of Science and Medicine in Sport*. Advance online publication. Retrieved from <http://www.jsams.org/>
- Hardy, L., Roberts, R., Thomas, P. R., & Murphy, S. M. (2010). Test of Performance Strategies (TOPS): Instrument refinement using confirmatory factor analysis. *Psychology of Sport and Exercise*, 11, 27-35. doi:10.1016/j.psychsport.2009.04.007
- Harmison, R. J. (2011). Peak performance in sport: Identifying ideal performance states and developing athletes' psychological skills. *Sport, Exercise, and Performance Psychology*, 1, 3-18. doi:10.1037/2157-3905.1.S.3
- Healy, L. C., Ntoumanis, N., Veldhuijzen van Zanten, J. J. C. S., & Paine, N. (2014). Goal striving and well-being in sport: The role of contextual and personal motivation. *Journal of Sport & Exercise Psychology*, 36, 446-459. doi:10.1123/jsep.2013-0261
- Hollings, S., Mallett, C., & Hume, P. (2014). The transition from elite junior track-and-field athlete to successful senior athlete: Why some do, why others don't. *International Journal of Sports Science and Coaching*, 9, 457-472. doi:10.1260/1747-9541.9.3.457
- Hosseini, S. A., & Besharat, M. A. (2010). Relation of resilience with sport achievement and mental health in a sample of athletes. *Procedia Social and Behavioral Science*, 5, 633-638. doi:10.1016/j.sbspro.2010.07.156
- IBM. (2013). IBM SPSS Statistics (Version 22.0.0.1) [Computer software]. Meadville, PA: IBM.
- Kipp, L. E., & Weiss, M. R. (2013). Social influences, psychological need satisfaction, and well-being among female adolescent gymnasts. *Sport, Exercise, and Performance Psychology*, 2, 62-75. doi:10.1037/a0030236
- Lazarus, R. S. (1966). *Psychological stress and the coping process*. New York, NY: McGraw-Hill.
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York, NY: Springer.

- Lindwall, M., Weman-Josefsson, K., Sebire, S. J., & Standage, M. (2016). Viewing exercise goal content through a person-oriented lens: A self-determination perspective. *Psychology of Sport and Exercise*, 27, 85-92. doi:10.1016/j.psychsport.2016.06.011
- Lo, Y., Mendell, N. R., & Rubin, D. B. (2001). Testing the number of components in a normal mixture. *Biometrika*, 88, 767-778. doi:10.1093/biomet/88.3.767
- Louvet, B., Gaudreau, P., Menaut, A., Genty, J., & Deneuve, P. (2007). Longitudinal patterns of stability and change in coping across three competitions: A latent class growth analysis. *Journal of Sport & Exercise Psychology*, 29, 100-117.
- Lubke, G. H., & Muthén, B. (2005). Investigating population heterogeneity with factor mixture models. *Psychological Methods*, 10, 21-39. doi:10.1037/1082-989X.10.1.21
- Mageau, G. A., & Vallerand, R. J. (2003). The coach-athlete relationship: A motivational model. *Journal of Sports Sciences*, 21, 883-904. doi:10.1080/0264041031000140374
- Mahoney, M. J., Gabriel, T. J., & Perkins, T. S. (1987). Psychological skills and exceptional athletic performance. *The Sport Psychologist*, 1, 181-199.
- Martinent, G., & Nicolas, M. (2016). A latent profile transition analysis of coping within competitive situations. *Sport, Exercise, and Performance Psychology*, 5, 218-231. doi:10.1037/spy0000062
- McGregor, H. A., & Elliot, A. J. (2002). Achievement goals as predictors of achievement-relevant processes prior to task engagement. *Journal of Educational Psychology*, 94, 381-395. doi:10.1037/0022-0663.94.2.381
- Morin, A. J. S., & Marsh, H. W. (2015). Disentangling shape from level effects in person-centered analyses: An illustration based on university teachers' multidimensional profiles of effectiveness. *Structural Equation Modeling: A Multidisciplinary Journal*, 22, 39-59. doi:10.1080/10705511.2014.919825
- Morin, A. J. S., & Wang, J. C. K. (2016). A gentle introduction to mixture modeling using physical fitness performance data. In N. Ntoumanis & N. D. Myers (Eds.), *An introduction to intermediate and advanced statistical analyses for sport and exercise scientists* (pp. 183-209). Chichester, UK: Wiley.
- Mouratidis, A., Vansteenkiste, M., Lens, W., & Sideridis, G. (2008). The motivating role of positive feedback in sport and physical education: Evidence for a motivational model. *Journal of Sport & Exercise Psychology*, 30, 240-268.

- Muthén, L. K., & Muthén, B. O. (2015a). Mplus (Version 7.4) [Computer software]. Los Angeles, CA: StatModel.
- Muthén, L. K., & Muthén, B. O. (2015b). *Mplus user's guide* (7th ed.). Los Angeles, CA: Muthén & Muthén.
- Ng, J. Y. Y., Lonsdale, C., & Hodge, K. (2011). The Basic Needs Satisfaction in Sport Scale (BNSSS): Instrument development and initial validity evidence. *Psychology of Sport and Exercise, 12*, 257-264. doi:10.1016/j.psychsport.2010.10.006
- Park, C. L. (1998). Stress-related growth and thriving through coping: The roles of personality and cognitive processes. *Journal of Social Issues, 54*, 267-277. doi:10.1111/0022-4537.651998065
- Pastor, D. A., Barron, K. E., Miller, B. J., & Davis, S. L. (2007). A latent profile analysis of college students' achievement goal orientation. *Contemporary Educational Psychology, 32*, 8-47. doi:10.1016/j.cedpsych.2006.10.003
- Pensgaard, A. M., & Duda, J. L. (2003). Sydney 2000: The interplay between emotions, coping, and the performance of Olympic-level athletes. *The Sport Psychologist, 17*, 253-267.
- Podsakoff, P. M., MacKenzie, S. B., & Podsakoff, N. P. (2012). Sources of method bias in social science research and recommendations on how to control it. *Annual Review of Psychology, 63*, 539-569. doi:10.1146/annurev-psych-120710-100452
- Porath, C., Spreitzer, G., Gibson, C., & Garnett, F. G. (2012). Thriving at work: Toward its measurement, construct validation, and theoretical refinement. *Journal of Organizational Behavior, 33*, 250-275. doi:10.1002/Job.756
- Rees, T., Hardy, L., Güllich, A., Abernethy, B., Côté, J., Woodman, T., . . . Warr, C. (2016). The Great British medalists project: A review of current knowledge on the development of the world's best sporting talent. *Sports Medicine, 46*, 1041-1058. doi:10.1007/s40279-016-0476-2
- Reinboth, M., Duda, J. L., & Ntoumanis, N. (2004). Dimensions of coaching behavior, need satisfaction, and the psychological and physical welfare of young athletes. *Motivation and Emotion, 28*, 297-313. doi:10.1023/B:MOEM.0000040156.81924.b8
- Reivich, K. J., Seligman, M. E. P., & McBride, S. (2011). Master resilience training in the U.S. Army. *American Psychologist, 66*, 25-34. doi:10.1037/a0021897

- Rocchi, M., Pelletier, L., Cheung, S., Baxter, D., & Beaudry, S. (2017). Assessing need-supportive and need-thwarting interpersonal behaviours: The Interpersonal Behaviours Questionnaire (IBQ). *Personality and Individual Differences, 104*, 423-433. doi:10.1016/j.paid.2016.08.034
- Rumbold, J. L., Fletcher, D., & Daniels, K. (2012). A systematic review of stress management interventions with sport performers. *Sport, Exercise, and Performance Psychology, 1*, 173-193. doi:10.1037/a0026628
- Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. New York, NY: Guilford Press.
- Ryan, R. M., & Frederick, C. (1997). On energy, personality, and health: Subjective vitality as a dynamic reflection of well-being. *Journal of Personality, 65*, 529-565. doi:10.1111/j.1467-6494.1997.tb00326.x
- Ryan, R. M., Huta, V., & Deci, E. L. (2013). Living well: A self-determination theory perspective on eudaimonia. In A. Delle Fave (Ed.), *The exploration of happiness* (pp. 117-139). Dordrecht, Netherlands: Springer.
- Sarkar, M., & Fletcher, D. (2014a). Ordinary magic, extraordinary performance: Psychological resilience and thriving in high achievers. *Sport, Exercise, and Performance Psychology, 3*, 46-60. doi:10.1037/spy0000003
- Sarkar, M., & Fletcher, D. (2014b). Psychological resilience in sport performers: A review of stressors and protective factors. *Journal of Sports Sciences, 32*, 1419-1434. doi:10.1080/02640414.2014.901551
- Sarkar, M., Fletcher, D., Stride, C., & Munir, F. (2016). *Development and validation of the Sport Resilience Scale (SRS)*. Manuscript submitted for publication.
- Scales, P. C., Benson, P. L., Leffert, N., & Blyth, D. A. (2000). Contribution of developmental assets to the prediction of thriving among adolescents. *Applied Developmental Science, 4*, 27-46. doi:10.1207/S1532480XADS0401_3
- Schinke, R. J., & Jerome, W. C. (2002). Understanding and refining the resilience of elite athletes: An intervention strategy. *Athletic Insight, 4*, 1-13.
- Schwartz, G. (1978). Estimating the dimension of a model. *The Annals of Statistics, 6*, 461-464. doi:10.1214/aos/1176344136
- Sheldon, K. M., & Filak, V. (2008). Manipulating autonomy, competence, and relatedness support in a game-learning context: New evidence that all three

- needs matter. *British Journal of Social Psychology*, 47, 267-283.
doi:10.1348/014466607x238797
- Spreitzer, G., & Porath, C. (2014). Self-determination as a nutriment for thriving: Building an integrative model of human growth at work. In M. Gagné (Ed.), *The Oxford handbook of work engagement, motivation, and self-determination theory* (pp. 245-258). New York, NY: Oxford University Press.
- Spreitzer, G., Sutcliffe, K., Dutton, J., Sonenshein, S., & Grant, A. M. (2005). A socially embedded model of thriving at work. *Organization Science*, 16, 537-549. doi:10.1287/orsc.1050.0153
- Standage, M. (2012). Motivation: Self-determination theory and performance in sport. In S. M. Murphy (Ed.), *The Oxford handbook of sport and performance psychology* (pp. 233-249). New York, NY: Oxford University Press.
- Su, R., Tay, L., & Diener, E. (2014). The development and validation of the comprehensive inventory of thriving (CIT) and the brief inventory of thriving (BIT). *Applied Psychology: Health and Well-Being*, 6, 251-279.
doi:10.1111/aphw.12027
- Tabachnick, B. G., & Fidell, L. S. (2013). *Using multivariate statistics* (6th ed.). London, UK: Pearson.
- Thoits, P. (1995). Stress, coping, and social support processes. Where are we? What next? *Journal of Health and Social Behavior*, 35, 53-79.
- Thompson, E. R. (2007). Development and validation of an internationally reliable short-form of the Positive and Negative Affect Schedule (PANAS). *Journal of Cross-Cultural Psychology*, 38, 227-242. doi:10.1177/0022022106297301
- Turner, M. J., Jones, M. V., Sheffield, D., Slater, M. J., Barker, J. B., & Bell, J. J. (2013). Who thrives under pressure? Predicting the performance of elite academy cricketers using the cardiovascular indicators of challenge and threat states. *Journal of Sport & Exercise Psychology*, 35, 387-397.
- Vansteenkiste, M., & Ryan, R. M. (2013). On psychological growth and vulnerability: Basic psychological need satisfaction and need frustration as a unifying principle. *Journal of Psychotherapy Integration*, 23, 263-280.
doi:10.1037/a0032359
- Weinberg, R. S., Seabourne, T. G., & Jackson, A. (1981). Effects of visuo-motor

behavior rehearsal, relaxation, and imagery on karate performance. *Journal of Sport Psychology*, 3, 228-238.

Closing Commentary


In the study presented in this Chapter, it was demonstrated that it is possible to assess sport performers' levels of functioning using indices of performance and well-being, and that functioning can be used to differentiate between performers' responses to competitive encounters. In addition, a high-functioning 'thriving' profile was identified, which suggests that this method of assessment offers a novel approach for determining thriving in sport performers. These findings therefore add to the extant literature that supported the derivation of the conceptualization proposed in Chapter 2, and offer the first empirical evidence of its utility in sport. However, these results only provide information on functioning classifications on one occasion and, therefore, are unable to demonstrate whether these profiles persist over time and whether membership to a profile is stable. To answer such questions, it is necessary to conduct longitudinal analysis and to assess intra-individual changes in functioning (cf. Fitzmaurice, Laird, & Ware, 2011); this approach will be adopted in the study presented in Chapter 4.

The results from this study also identified possible predictive relationships between the personal enablers and basic needs process variables with profile membership. To further understanding of these relationships and to verify their direction (e.g., whether needs satisfaction predicts thriving or whether thriving predicts needs satisfaction?), studies can be designed to monitor the corresponding patterns of change in the variables across multiple assessments (cf. Nagin & Tremblay, 2001), or with discrete times of variable measurement thereby disentangling the effect of one variable on the other. Within the following two chapters, these approaches to inquiry are adopted to elicit greater understanding of how the process variables impact thriving in sport performers.

Chapter 4. One-off or Serial Thrivers? A Latent Class Growth Analysis of Sport Performers' Responses to Competitive Sporting Encounters Over Time

Introductory Commentary

To advance the findings found in the exploratory cross-sectional analysis reported in Chapter 3, the study presented in this Chapter extends the assessment of thriving to encompass multiple sporting encounters. This approach was adopted to examine whether sport performers' levels of functioning change over time and, thus, to explore whether individuals who thrive in one encounter, also thrive in subsequent competitive events (cf. Section 2.5). In addition, the study investigates whether changes in functioning coincided with fluctuations in performers' perceptions of two possible process variables (viz. basic psychological needs satisfaction and frustration; Deci & Ryan, 2000). These variables were selected as they were found to be significant predictors of profile membership in Study 1 (see Section 3.4.3), and have previously been theorized to be proximal determinants of thriving (see, e.g., Sheldon, 2009), with levels of needs satisfaction shown to elicit thriving at work (Spreitzer & Porath, 2014; see also, Spreitzer, Sutcliffe, Dutton, Sonenshein, & Grant, 2005). Based on these findings, it was suggested that basic psychological needs may represent a key predictor of thriving in sport.

This declaration concerns the article entitled:									
One-off or Serial Thrivers? A Latent Class Growth Analysis of Sport Performers' Responses to Competitive Sporting Encounters Over Time									
Publication status (tick one)									
draft manuscript	<input checked="" type="checkbox"/>	Submitted	<input type="checkbox"/>	In review	<input type="checkbox"/>	Accepted	<input type="checkbox"/>	Published	<input type="checkbox"/>
Publication details (reference)	Brown, D. J., Arnold, R., Standage, M., & Fletcher, D. (2017). <i>One-off or serial thrivers? A latent class growth analysis of sport performers' responses to competitive sporting encounters over time</i> . Manuscript in preparation.								
Candidate's contribution to the paper (detailed, and also given as a percentage).	<p>Formulation of ideas: The candidate was predominantly responsible for the conceptualization of the paper, the identification of variables for investigation, and the formulation of original hypotheses. Candidate contribution = 75%</p> <p>Design of methodology: The candidate considerably contributed to the design of methodology used in the study, the identification of suitable measures, and selection of data analysis techniques. Candidate contribution = 75%</p> <p>Experimental work: The candidate was responsible for the collection of all data in the study and for running all analyses. Candidate contribution = 95%</p> <p>Presentation of data in journal format: The candidate drafted the manuscript in its entirety and formatted it according to journal specifications. The remaining authors read revisions of the manuscript and provided comments accordingly. Candidate contribution = 80%</p>								
Statement from Candidate	This paper reports on original research I conducted during the period of my Higher Degree by Research candidature.								
Signed							Date	24/04/2017	

Evidence of permission to use published paper: N/A.

Data access statement: To be provided following the acceptance of the manuscript in a journal.

4.1 Abstract

Sport performers typically have to maintain their functioning across a program of competitive events or fixtures. The purpose of this study was to conduct the first examination of sports performers' levels of functioning over time and to explore whether common growth trajectories exist. A secondary purpose was to investigate whether changes in functioning coincided with changes in athletes' perceptions of psychological needs satisfaction and frustration. Sport performers ($N = 175$; $M_{age} = 24.27$ years, $SD_{age} = 8.93$) completed a series of multi-section questionnaires following their sporting encounters. Latent class growth analysis revealed three trajectory classes (viz. *High to Low Functioning*, *Above Average Stable Functioning*, *Low Stable Functioning*). Expected patterns were observed for functioning at average and low (high) levels of needs satisfaction (frustration); however, neither variable offered robust prediction for high-level functioning. These novel classes and results may have important implications for theory, future research, and practice.

4.2 Introduction

Why is it that some individuals appear to thrive on the demands they encounter, where others merely manage or succumb? Scientific inquiry over the past 20 years has begun to examine this adaptive (rather than solely maladaptive) response across a range of domains in an attempt to answer such research questions (see, for a review, Brown, Arnold, Fletcher, & Standage, in press; see Chapter 2; see also, Donaldson, Dollwet, & Rao, 2015). Exactly what it means to be *thriving* has taken many forms during this time depending on the context (e.g., adolescent populations, work) in which the construct has been examined; however, most recently, Brown, Arnold, Fletcher et al. (in press; see Chapter 2) proposed that thriving in humans can be universally described as the experience of development and success, resulting from effective holistic functioning and evidenced through the experience of high-level well-being and the perception of high-level performance. In recent years, attention has also been placed on thriving in sport performers (see, e.g., Brown, Arnold, Standage, & Fletcher, 2017; see Chapter 3; see also, Galli & Reel, 2012; Gucciardi & Jones, 2012). For sport performers, the manifestation of thriving appears highly desirable, offering both immediate gains (e.g., excellent performance) and long-term development (e.g., increased confidence; Brown, Arnold, Reid, &

Roberts, 2017).

Extant research on thriving in the sports context has been limited to a small number of studies. Arguably, the first researchers to consider thriving in sport were Galli and Vealey (2007, 2008) in their work on stress-related growth. Although not explicitly conceptualizing and examining thriving within their work, Galli and Vealey use thriving as a description for performers who experienced adaptive responses following adversity (see also, Galli & Reel, 2012). A second consideration of thriving appears in scholarly work that has examined the relationship between mental toughness and thriving (see, Gucciardi, Hanton, Gordon, Mallett, & Temby, 2015; Gucciardi, Jackson, Hodge, Anthony, & Brooke, 2015; Gucciardi & Jones, 2012). In these studies, however, thriving has often been included as a secondary outcome of interest and has been conceptualized using both the positive youth development literature (cf. Benson, 2002), and that on thriving at work (cf. Spreitzer, Sutcliffe, Dutton, Sonenshein, & Grant, 2005). The limitations of such inconsistent use of conceptualizations and the lack of direct focus on thriving in the extant literature has meant that little knowledge has been gleaned on what it actually means for performers to thrive in a sporting context and what factors contribute to this experience.

In an attempt to bring thriving in sport performers to the forefront of inquiry and further knowledge on this topic, Brown, Arnold, Standage et al. (2017; see Chapter 3) tested the validity of a novel and holistic conceptualization of thriving in a sample of athletes, and then used this measurement model to explicitly investigate whether a *thriving* group existed and how it was characterized. More specifically, thriving was measured using performance and well-being as indicators of athletes' functioning (cf. Brown, Arnold, Fletcher, et al., in press; see Chapter 2), and factor mixture analysis (FMA) revealed four profiles: a high functioning (thriving) group, a low functioning group, and two groups with functioning above and below the sample mean. Initial evidence was also found to suggest that profile membership was predicted by personal enablers (viz., personal resilient qualities, psychological skills use), and process variables (viz., basic psychological needs satisfaction and frustration), with the likelihood of membership to the thriving group increased by reporting higher levels of personal enablers, and basic psychological need satisfaction. Although this study significantly advanced the extant literature by being the first study to explicitly examine thriving in this population and to identify

four distinct functioning groups, it is limited by its cross-sectional design. To elaborate, FMA and other cross-sectional analytic techniques are only able to capture experiences at one point in time and assume that model parameters are stable over time (Bowen & Wiersema, 1999). In reality, however, athletes rarely compete in isolated events and, instead, have to maintain their functioning across a program of competitive events or fixtures. Thus, although these techniques inform us about whether an athlete thrived within one sporting encounter, they provide no information on whether this had an impact on subsequent encounters, or whether it is possible to thrive over time (cf. Brown, Arnold, Fletcher, et al., in press; see Chapter 2; see also, Louvet, Gaudreau, Menaut, Genty, & Deneuve, 2007). To extend understanding in this area, it therefore appears salient to examine thriving longitudinally by assessing performers' functioning across multiple competitive sporting encounters. Adopting this approach would enable any intrapersonal stability and change in functioning to be identified, as well as whether any common growth trajectories exist across individuals (see, e.g., Martinent & Nicolas, 2016; Warren, Wray-Lake, Rote, & Shubert, 2016).

A longitudinal assessment of sport performers' functioning would also enable the investigation of whether changes in functioning correspond with changes in other related psychological processes (cf. Nagin & Tremblay, 2001). Identifying simultaneous fluctuations in these variables can help inform and direct applied practitioners when working to facilitate increases in functioning or when helping athletes maintain high-levels of functioning. Two such variables that may be pertinent to athletes' functioning over time are perceptions of basic psychological needs satisfaction and basic psychological needs frustration. Indeed, according to basic needs theory (Deci & Ryan, 2000; Ryan & Deci, 2002) and extant research conducted on thriving at work (Spreitzer & Porath, 2014), humans have three basic psychological needs (viz., autonomy, competence, and relatedness) which, if satisfied, can elicit thriving. More specifically, it is purported that these needs are fundamental for ongoing growth and well-being, and that, as humans have an organismic tendency towards growth, the needs act to energize and direct behaviour (Deci & Ryan, 2000). Therefore, should an individual perceive satisfaction of his or her basic psychological needs, they would be expected to experience development and success. Conversely, should an individual perceive frustration of his or her needs, they would be anticipated to experience degradation and failure.

In terms of the existing literature, no longitudinal studies currently exist examining the effects of psychological needs on thriving in athletic populations; however, studies have been conducted to test the relationship between athletes' psychological needs and performance (e.g., Cheon, Reeve, Lee, & Lee, 2015) and psychological needs and well-being (e.g., Adie, Duda, & Ntoumanis, 2012; Balaguer et al., 2012; Reinboth & Duda, 2006) separately over time. Within these studies, there is some evidence to suggest that needs satisfaction can have a positive effect on well-being and needs frustration may have a negative effect over time; however, little is currently known about the effects on performance outcomes. Furthermore, these studies have typically only looked at data collected from two time-points, and thus very little is actually known about whether fluctuations in needs perceptions over time correspond with changes in thriving indicators.

Given the position of the extant literature on thriving, the purpose of the current study was to examine sport performers' levels of functioning over time and explore whether common growth trajectories exist. It was hypothesized that distinct trajectories would be identified; however, given the lack of research in this area, no predictions were made on the number or shape of the trajectories. Second, we aimed to investigate whether changes in functioning over time coincided with changes in athletes' perceptions of psychological needs satisfaction and frustration. Based on previous research in this area (e.g., Reinboth & Duda, 2006; Spreitzer & Porath, 2014), it was hypothesized that a relationship would exist between trajectory groups identified for functioning, and those identified for needs satisfaction and frustration.

4.3 Method

4.3.1 Participants

One hundred and seventy-five sport performers (52 females) aged between 16 and 62 years ($M_{\text{age}} = 24.27$ years, $SD_{\text{age}} = 8.93$ years) participated in this study, and were a subset of those previously sampled in Brown, Arnold, Standage et al. (2017; see Chapter 3). The majority of participants (81.7%) were recruited from team sports (e.g., basketball, cricket, field hockey), but a variety of individual sports (e.g., archery, fencing, horse riding) were also represented. Participants were drawn from youth (17.7%) and senior (81.1%) age groups, with participants' average competitive sporting experience being 12.33 years ($SD = 7.43$). A range of competitive standards were identified with 2.3% of performers reporting having

competed at an intracub level, 25.1% at a local level, 36.6% at a regional level, 30.3% at a national level, 4.6% at an international level, and 0.6% as a professional.

4.3.2 Procedures

All sport performers who previously took part in Brown, Arnold, Standage et al. (2017; see Chapter 3) were contacted 10 days after study completion to enquire whether they would be willing to continue their involvement in a longitudinal study. Participants were informed about the nature of the extended project and of their ethical rights (e.g., confidentiality, right to withdraw). Participation was voluntary and consent was required from adult participants and from coaches or teachers in loco parentis for sport performers under the age of 18 years. The study involved participants completing four multi-section questionnaires, which were available in both written and electronic formats. Each questionnaire was designed to be distributed 14-days after the previous response was collected, with each survey asking participants to reflect on their experiences in a competitive fixture during the past two weeks. The actual length of time between the responses for the first and second survey ranged from 12 to 64 days, time between the second and third survey responses ranged from 10 to 64 days, and time between the third and fourth survey responses ranged from 11 and 70 days. Where less than 14 days had elapsed between surveys, responses were checked to ensure that participants had reported on two different competitive encounters. The variation in timing for survey completion resulted from participants having not competed as a result of injury, non-selection, or the lack of a competitive fixture. Participants were excluded from the study if they had not completed a minimum of three of the time-points.

4.3.3 Measures

4.3.3.1 Functioning

Sport performers' competitive functioning was assessed using scores obtained for subjective performance and well-being (cf. Brown, Arnold, Standage, et al., 2017; see Chapter 3). Subjective performance was determined using performers' satisfaction with their performance in a specific sporting encounter (e.g., competition, match) occurring within the previous two weeks on an 11-point scale (0 = *totally dissatisfied*, 10 = *totally satisfied*) (cf. Pensgaard & Duda, 2003). Positive affect was used as a marker of hedonic well-being (cf. Kahneman, Diener, & Schwarz, 1999) and was assessed using the International Positive and Negative

Affect Schedule Short Form (I-PANAS-SF; Thompson, 2007). Specifically, participants reported the regularity with which they experienced five emotional descriptors (e.g., inspired) during the encounter on a five-point scale (1 = *never*, 5 = *always*). Cronbach's alpha values for the I-PANAS-SF were acceptable, ranging from 0.70 to 0.80. Subjective vitality was used as an indicator of eudaimonic well-being (cf. Ryan, Huta, & Deci, 2008), and was assessed using the Subjective Vitality Scale (SVS; Ryan & Frederick, 1997). Specifically, participants responded to items measuring the accuracy of the statement with their experience of aliveness and energy in the encounter on a six-point scale (1 = *not at all true*, 6 = *very true*). Cronbach's alpha values for the SVS were acceptable, ranging from 0.86 to 0.96.

4.3.3.2 Needs satisfaction and needs frustration

Sport performers' levels of basic psychological needs satisfaction was assessed using The Basic Needs Satisfaction in Sport Scale (BNSSS; Ng, Lonsdale, & Hodge, 2011). Specifically, performers responded to items measuring autonomy satisfaction (six items), competence satisfaction (five items), and relatedness satisfaction (five items) on a seven-point scale (1 = *not at all true*, 7 = *very true*). Acceptable levels of reliability were obtained for autonomy satisfaction (Cronbach's alpha range = 0.79 to 0.88), competence satisfaction (0.88 to 0.92), and relatedness satisfaction (0.78 to 0.87). Performers' basic psychological needs frustration was measured using nine items taken from the Basic Psychological Needs Scale (BPNS; Chen et al., 2015). Specifically, performers responded to three-item subscales for autonomy frustration, competence frustration, and relatedness frustration on a seven-point scale (1 = *not at all true*, 7 = *very true*). Cronbach's alpha values for the three subscales ranged from 0.66 to 0.76, 0.68 to 0.77, and 0.67 to 0.77 respectively.

4.3.4 Data Analysis

Analyses were conducted in two stages: measurement invariance assessment and latent class growth analysis (LCGA). All analyses were conducted in Mplus 7.4 (Muthén & Muthén, 2015a) and used a full information maximum likelihood robust (MLR) estimation to account for any non-normality² and missing data. Given the substantial variability in the exact times of assessment, time was modelled using

² Assessments of skewness and kurtosis suggested that data were kurtotic for subjective vitality at the 2nd ($K = 2.83$), 3rd ($K = 2.22$), and 4th ($K = 2.04$) time points; for autonomy satisfaction at the 1st time point ($K = 2.83$); for competence satisfaction at the 3rd ($K = 2.70$) time point; and for relatedness frustration at the 1st ($K = 2.36$) and 4th ($K = 3.42$) time points.

individually-varying times of observations (see, Berlin, Parra, & Williams, 2014; Muthén & Muthén, 2015b).

4.3.4.1 Measurement invariance

Longitudinal measurement invariance was assessed for functioning, needs satisfaction, and needs frustration variables. Error covariances between matching indicators (e.g., subjective performance) across assessments were estimated freely because the same items were used and the sources of error were anticipated to be the same (Geiser, 2012). Invariance testing followed a nested approach whereby increasingly restrictive models were fit to the data to establish whether scores were computed reliably from the indicators, across the four assessments. In the first step, a configural model was applied to the data with all parameters freely estimated. In the second model, a metric configuration was used with factor loadings held constant across assessments, and in the third model, factor loadings and intercepts were fixed to equality. Chi-square values, comparative fit index (CFI), and root mean square error of approximation (RMSEA) were used to determine measurement invariance. Invariance was indicated when changes of ≤ 0.010 were found for CFI (Cheung & Rensvold, 2002), and of ≤ 0.015 for RMSEA (Chen, 2007) when comparing the two models. Difference testing for the MLR chi-square values was conducted using the Satorra-Bentler scaled chi-square (Satorra & Bentler, 1999), with a non-significant difference indicating the existence of measurement invariance.

4.3.4.2 Latent class growth analysis

This part of the analysis was directed by existing guidelines on LCGA/growth mixture modelling (Grimm & Ram, 2009; Jung & Wickrama, 2008) and on the inclusion of auxiliary variables (e.g., covariates, distal outcomes) in mixture modelling (Asparouhov & Muthén, 2014; Nylund-Gibson, Grimm, Quirk, & Furlong, 2014). First, a linear latent growth curve model (LGM) was fit to the data to calculate the sample means, variances, and covariances for the latent growth factors (i.e., intercept, slope). Intercepts represent the baseline scores recorded at the first time-point, and the slopes measure the change in these scores across all of the time-points recorded. For these and subsequent analyses, the constraints identified within the measurement invariance testing were applied, error covariances between repeated items were freely estimated, the intercept factor loadings were specified at 1, and the slope factors were determined by the individually-varying times of

assessments.

The second step in the analysis involved specifying an unconditional latent class model and determining the number of latent classes. Consistent with the LCGA approach, within-class variance was set to zero, stipulating that individuals included within each class had identical intercept values and slope trajectories. The decision was made to not release these constraints and proceed to a full growth mixture model because increasing model complexity through the addition of classes and across-class variation in the covariance matrix can result in convergence issues, improper solutions, and model instability (Jung & Wickrama, 2008). To facilitate the use of participants' individually-varying times of assessment, it was necessary to employ a random mixture computational model (Muthén & Muthén, 2015b). As a consequence, this meant that the number of classes was determined statistically using the Bayesian information criteria (BIC) value (lowest value), successful convergence, entropy values (near 1.0), percentage of total count in a class (all classes > 1%), and posterior probabilities (near 1.0). Judgments were also based on the level of parsimony, theoretical justification, and interpretability.

The final step in the analysis examined the associations between functioning classes, and those derived for needs satisfaction and needs frustration using dual trajectory LCGA with a three-step approach (see, e.g., Warren et al., 2016). This method establishes the conditional probabilities of membership in each class on one variable (i.e., functioning), given membership in a class on the other variable (i.e., needs satisfaction, needs frustration). The three-step approach fixes the measurement parameters of the latent class variable in the dual model at those established in the unconditional model, and prevents any shifts in the measurement parameters following the inclusion of the second LCGA model (Asparouhov & Muthén, 2014; Nylund-Gibson et al., 2014).

4.4 Results

Data screening procedures resulted in two cases with missing data being removed from the data set. No unengaged responses were found, which resulted in a final sample size of 173. Eighty-three participants had data from four time-points and 90 participants had data from three time-points.

4.4.1 Measurement Invariance

Measurement invariance in the factor loadings and intercepts was found for

the needs satisfaction responses (see Table 4.1). However, results only suggested invariance of factor loadings for the assessment of needs frustration and functioning responses. Evidence of partial intercept invariance was found when one of the intercepts was freely estimated in each model ($\Delta\text{CFI} \leq 0.01$, $\Delta\text{RMSEA} \leq 0.015$).

4.4.2 Latent Class Growth Analysis

4.4.2.1 Functioning

The results from the LGM identified significant mean and variance values for the functioning intercept variable, but non-significant values for the slope mean and variances, and covariance between the functioning intercept and slope values (see Table 4.2). To examine the significant variability in the intercept parameters, LCGA procedures were conducted with one-, two-, three-, and four-class models. A three-class model was selected for functioning as the solution had the lowest BIC, equal highest entropy value, the smallest group included 2.3% of the total count, and the minimum posterior probability was 0.90 (see Table 4.3). The first functioning class, “*High to Low Functioning*”³, included individuals (2.3% of sample) who achieved a very high level of functioning at the initial assessment, but this significantly decreased over the season (see Table 4.2). The largest proportion (76.9%) of sport performers were clustered in the second functioning class, “*Above Average Stable Functioning*”. This class included individuals who reported a level of functioning that was above the sample average at the initial assessment and this level remained stable across the remaining time points. The third group (20.8% of sample), “*Low Stable Functioning*”, comprised individuals who had a low level of functioning across all time points.

4.4.2.2 Needs satisfaction

The LGM fit to the needs satisfaction data resulted in significant mean and variance values for the intercept variable, variance for the slope variable, covariance between the intercept and slope parameters, and a nonsignificant slope mean value (see Table 4.2). These results therefore suggest that some underlying variability existed in the sample on their initial needs satisfaction levels and change in these levels over the season. LCGA was used to test the suitability of one-, two-, three-,

³ Labels assigned to the classes are interpretable in relation to the overall sample characteristics.

Table 4.1 *Results of the Longitudinal Measurement Invariance Tests*

Model	<i>N</i>	$\chi^2_{(df)}$	$\Delta\chi^2_{(df)}$	TLI	CFI	Δ CFI	RMSEA	Δ RMSEA	Δ RMSEA 90%CI
Functioning									
Configural	173	52.014 [*] ₍₃₀₎	—	0.925	0.966	—	0.065	—	[0.033, 0.094]
Metric	173	64.942 [*] ₍₃₆₎	12.541 ₍₆₎	0.918	0.955	0.011	0.068	0.003	[0.041, 0.094]
Scalar	173	106.535 [*] ₍₄₂₎	46.424 [*] ₍₆₎	0.843	0.900	0.055	0.094	0.026	[0.072, 0.117]
Partial intercept ^a	173	77.006 [*] ₍₄₁₎	12.430 [*] ₍₅₎	0.910	0.944	0.011	0.071	0.003	[0.046, 0.096]
Needs Satisfaction									
Configural	173	43.095 ₍₃₀₎	—	0.967	0.985	—	0.050	—	[0.000, 0.082]
Metric	173	46.126 ₍₃₆₎	3.562 ₍₆₎	0.979	0.988	0.003	0.040	0.010	[0.000, 0.071]
Scalar	173	60.204 [*] ₍₄₂₎	14.314 [*] ₍₆₎	0.967	0.979	0.009	0.050	0.010	[0.014, 0.077]
Needs Frustration									
Configural	173	49.684 [*] ₍₃₀₎	—	0.942	0.974	—	0.062	—	[0.028, 0.091]
Metric	173	53.288 [*] ₍₃₆₎	3.168 ₍₆₎	0.957	0.977	0.003	0.053	0.009	[0.016, 0.081]
Scalar	173	81.575 [*] ₍₄₂₎	27.333 [*] ₍₆₎	0.917	0.947	0.030	0.074	0.021	[0.049, 0.098]
Partial intercept ^b	173	62.762 [*] ₍₄₁₎	9.362 ₍₅₎	0.953	0.971	0.006	0.055	0.002	[0.024, 0.082]

Note. Configural (all parameters freely estimated); Metric (factor loadings constrained to equality); Scalar (factor loadings and intercepts constrained to equality); Partial intercept (factor loadings and intercepts constrained to equality, but with one intercept freely estimated); $\chi^2_{(df)}$ = χ -square and degrees of freedom; TLI = Tucker-Lewis Index; CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation; CI = confidence interval.

^aPositive affect (time 1) intercept freely estimated. ^bCompetence frustration (time 1) intercept freely estimated.

* $p < 0.05$

and four-class models for explaining the data. A three-class model was selected for needs satisfaction because it had the lowest BIC, a high entropy value, all group sizes made up $> 1\%$ of the total count, and the posterior probabilities were high (minimum 0.90, see Table 4.3). The first class, “*High to Low Needs Satisfaction*”, included sport performers (1.7% of the sample) who initially reported high levels of needs satisfaction; however, these levels substantially and significantly decreased over time. The second class, “*Average to Low Needs Satisfaction*”, comprised sport performers (85.0% of the sample) who reported moderate scores of needs satisfaction at the initial time point, though experienced a small, but significant, decrease over time. The final class, “*Low Stable Needs Satisfaction*”, included performers (13.3% of the sample) who reported low and stable levels of needs satisfaction over time.

4.4.2.3 Needs frustration

Statistically significant mean and variance values were found for the needs frustration intercept, the slope variance, and the covariance between the intercept and the slope in the LGM analysis (see Table 4.2). The slope mean estimate was non-significant. The results suggest that, when the sample is considered as a whole, significant variability exists in performers’ initial needs frustration levels and how these levels change over time. LCGA was conducted on one-, two-, three-, and four-class models, with the three-class model adopted for subsequent analysis (see Table 4.3). Although the two-class model had a marginally lower BIC than the three-class model, the latter was selected because it had a greater entropy value, all classes included $> 1\%$ of the total count, and the minimum posterior probability value was greater in the three-class model (0.93). The first needs frustration class, “*High to Low Needs Frustration*”, comprised 17.9% of the sport performers in the sample and included individuals who reported high initial levels of needs frustration which significantly decreased over the season (see Table 4.2). The second class (78.6% of sample), “*Below Average Stable Needs Frustration*”, included participants who recorded levels of needs frustration below the sample average and who reported relatively comparable levels across subsequent timepoints. The third class for needs frustration, “*Low to High Needs Frustration*”, was the smallest of the three groups (3.5% of the sample) and included participants who reported the lowest levels of needs frustration at the initial assessment; however, whose levels increased over time.

4.4.2.4 Dual trajectory models

Two dual trajectory LCGAs were run to examine the associations between trajectory classes on functioning and needs satisfaction, and functioning and needs frustration (see Table 4.4). Sport performers who were classified in the “*Low Stable Needs Satisfaction*” class had a probability of 1.0 for also being classified in the “*Low Stable Functioning*” class, and individuals within the “*Average to Low Needs Satisfaction*” class had a probability of 0.9 for being classified in the “*Above Average Stable Functioning*” class. The conditional probabilities for the “*High to Low Needs Satisfaction*” class were less uniform, with participants in this class assigned a 0.4 probability for being classified in the “*High to Low Functioning*” class, compared to 0.3 for the “*Above Average Stable Functioning*” and “*Low Stable Functioning*” classes.

The conditional probabilities for the functioning classes, given needs frustration class membership, were inversely related at higher levels of needs frustration. More specifically, sport performers who were classified in the “*High to Low Needs Frustration*” class had a 60.5% chance of being co-assigned to the “*Low Stable Functioning*” class and a 39.5% chance of residing in the “*Above Average Stable Functioning*” class. Furthermore, participants in the “*Below Average Stable Needs Frustration*” class had an 84.2% chance of being assigned to the “*Above Average Stable Functioning*” class, and only a 12.2% and 3.6% chance of residing in the “*Low Stable Functioning*” and “*High to Low Functioning*” classes, respectively. Contrary to expectation, participants in the “*Low to High Needs Frustration*” class were assigned a 0% chance of being allocated to the “*High to Low Functioning*” class, with performers instead assigned a 100% chance of residing in the “*Above Average Stable Functioning*” class.

4.5 Discussion

Sport performers typically have to maintain their functioning across a program of competitive events or fixtures. It therefore appears pertinent to examine whether performers’ levels of functioning in one scenario, impacts their functioning in subsequent encounters. In addition, little is known about the factors that impact functioning over time, thus, this study also investigated whether changes in functioning coincided with changes in salient psychological variables; namely, athletes’ perceptions of psychological needs satisfaction and frustration. The results

Table 4.2 Means, Variances, and Covariances between Study Variables for Functioning, Needs Satisfaction, and Needs Frustration Based on Most Likely Latent Class

	<i>N</i>	I Mean	I Variance	S Mean	S Variance	I-S Covariance
Functioning						
LGM						
Full	173	6.451*	0.860*	0.001	< 0.001	-0.002
LCGA						
Class 1 “High to Low”	4	7.509*	= 0.000	-0.091*	= 0.000	= 0.000
Class 2 “Above Average Stable”	133	6.916*	= 0.000	0.002	= 0.000	= 0.000
Class 3 “Low Stable”	36	4.799*	= 0.000	0.002	= 0.000	= 0.000
Needs Satisfaction						
LGM						
Full	173	5.769*	0.396*	-0.002	< 0.001*	0.396*
LCGA						
Class 1 “High to Low”	3	6.946*	= 0.000	-0.069*	= 0.000	= 0.000
Class 2 “Average to Low”	147	5.988*	= 0.000	-0.002*	= 0.000	= 0.000
Class 3 “Low Stable”	23	4.397*	= 0.000	0.006	= 0.000	= 0.000
Needs Frustration						
LGM						
Full	173	2.551*	0.608*	-0.002	< 0.001*	-0.001*
LCGA						
Class 1 “High to Low”	31	4.037*	= 0.000	-0.012*	= 0.000	= 0.000
Class 2 “Below Average Stable”	136	2.138*	= 0.000	-0.001	= 0.000	= 0.000
Class 3 “Low to High”	6	1.923*	= 0.000	0.065*	= 0.000	= 0.000

Note. *N* = number of participants; I = intercept; S = slope; LGM = linear latent growth model; LCGA = latent class growth analysis.

**p* < .05

Table 4.3 *Latent Class Growth Analysis Model Selection Criteria for Functioning, Needs Satisfaction, and Needs Frustration (n = 173)*

Model	BIC	Δ BIC	AIC	Entropy	Smallest Group (%)	Minimum PP
Functioning						
One class	4556.71		4427.42			
Two classes	4488.62	-68.09	4349.88	0.79	21.4	0.90
Three classes	4470.97	-17.65	4322.76	0.88	2.3	0.90
Four classes	4476.52	5.55	4318.86	0.88	1.7	0.78
Needs Satisfaction						
One class	4072.22		3946.09			
Two classes	3997.01	-75.21	3861.41	0.87	12.7	0.91
Three classes	3992.90	-4.11	3847.85	0.91	1.7	0.90
Four classes	4008.36	15.46	3853.85	0.93	0.0	0.00
Needs Frustration						
One class	5191.02		5061.74			
Two classes	5109.86	-81.16	4971.12	0.79	21.4	0.90
Three classes	5111.48	1.62	4963.28	0.88	3.5	0.93
Four classes	5126.94	15.46	4969.28	0.90	0.0	0.00

Note. All models are linear latent class growth analysis models. BIC = Bayesian information criterion; AIC = Akaike's information criterion; PP = Posterior probability.

Table 4.4 *Conditional Probabilities of Functioning Class Given Needs Satisfaction and Needs Frustration Class Membership (n = 173)*

	Functioning		
	High decreasing (2.3%)	Above average stable (76.9%)	Low stable (20.8%)
Needs Satisfaction^a			
High decreasing (1.7%)	0.411	0.289	0.299
Average decreasing (85.0%)	0.024	0.904	0.072
Low stable (13.3%)	0.000	0.000	1.000
Needs Frustration^b			
High decreasing (17.9%)	0.000	0.395	0.605
Below average stable (78.6%)	0.036	0.842	0.122
Low increasing (3.5%)	0.000	1.000	0.000

Note. ^aTwo multinomial logit parameters were fixed to avoid singularity of the information matrix. ^bOne multinomial logit parameter was fixed to avoid singularity of the information matrix.

provide the first indication that three types of functioning exist for sport performers over time; high to low functioning, above average stable functioning, and low stable functioning (see Table 4.2).

Individuals within the “*High to Low Functioning*” class responded by initially thriving in their sporting encounters; however, significantly decreased their functioning in subsequent encounters and are likely, therefore, to be only managing or succumbing to demands in these latter scenarios. This finding provides the first evidence to suggest that performers might be unable to sustain high-level functioning (i.e., thriving) over periods of time. One possible explanation for this may be that thriving, like other optimal experiences in sport (e.g., peak performance; Jackson & Roberts, 1992; Privette, 1982), is relatively rare and requires a perfect combination of enabling factors to be present. Alternatively, it may be the case that performers who have thrived in previous sporting encounters alter their expectations for subsequent scenarios (e.g., set higher personal standards), and adopt a perfectionistic characteristic of becoming overly critical when they fail to meet these; thus resulting in a substantial drop in perceived functioning (cf. Frost, Marten, Lahart, & Rosenblate, 1990; Stoeber, 2011). Based on the current results, it appears more achievable for performers to maintain an above average level of functioning over time. The stability in performers’ functioning in the largest class (*Above Average Stable Functioning*, 76.9% of the sample), may be an indication of sport performers’ abilities to consistently adapt and utilize their personal and contextual resources to cope with the various demands they encounter. This finding is somewhat in contrast to previous research, where athletes coping profiles have generally been found to change over time (Martinent & Decret, 2015; Martinent & Nicolas, 2016). One exception to this is that, when assigned to a low coping profile (i.e., moderate scores for effort expenditure and low scores of all other coping strategies), athletes demonstrate a consistently low level of psychological adjustment (Martinent & Nicolas, 2016). This observation may explain the lack of growth in functioning over time for those individuals in this study who demonstrated a low level of functioning at the first time-point (*Low Stable Functioning*, 20.8% of the sample). With the majority of the sample displaying stable levels of functioning (97.7%), an additional consideration for future research and practice is identifying triggers that can initiate an increase in a performer’s functioning to disrupt a more stable profile and induce thriving. For example, it would be interesting to investigate whether personal

experience of previous encounters actually offers any mechanisms for growth to increase functioning in a subsequent encounter or whether effects are contingent on external action (e.g., coach intervention).

Turning to the needs satisfaction and frustration variables, LCGA supported a three-class solution. For needs satisfaction, 1.7% of the performers initially perceived a high level of needs satisfaction which significantly decreased over time, 85.0% perceived an average level of needs satisfaction that significantly decreased, and 13.3% reported a low stable level of needs satisfaction over time. Previous research examining needs satisfaction over a competitive season has typically considered all participants within a homogeneous sporting population and has found mixed results, with some research suggesting that needs satisfaction increases over time (e.g., Adie et al., 2012), others suggesting it decreases (e.g., Balaguer et al., 2012), and some finding no change (e.g., Stenling, Lindwall, & Hassmén, 2015). The results of the current study provide clarity in this equivocal area, by suggesting that these mixed extant findings may have occurred from sampling sport performers across each of the newly identified groups. From our findings, it appears that the majority of sports performers experience their levels of needs satisfaction decreasing over time, since 86.7% of participants in this study resided in classes with significant, negative slopes. To the authors knowledge, however, no research currently exists that explains this decline over time in competitive sport; therefore, to ensure that sport performers finish the season in an optimal state of wellness (cf. Deci & Ryan, 2000), this may be a critical line of future research enquiry. When considering the results from the dual trajectory LCGA between functioning and needs satisfaction (see Table 4.4), largely expected patterns were observed. More specifically, a clear relationship appeared to exist between average and low levels of needs satisfaction and functioning, with over 90.0% of participants residing in the corresponding classes. This finding therefore adds to extant work that has identified relationships between athletes' levels of perceived needs satisfaction and performance (e.g., Carpentier & Mageau, 2013), well-being (e.g., Reinboth, Duda, & Ntoumanis, 2004), and functioning (e.g., Brown, Arnold, Standage, et al., 2017; see Chapter 3). Results were also supportive for this relationship at high levels of needs satisfaction, with participants in this class given a 41.1% chance of being categorized as high functioning; however, substantial probabilities also existed for the average (28.9%) and low (20.8%) functioning groups. This finding may partly be explained

by the small numbers of individuals within the “*High to Low Needs Satisfaction*” class, but it may also suggest that perceiving high needs satisfaction is not solely sufficient for enabling high functioning levels over time, and that other variables need to also be considered.

The three-class model for the needs frustration variable found 17.9% of performers to have high, decreasing levels of needs frustration; 78.6% to have below average, stable levels; and 3.5% initially recording low levels, but these increased over time. These results extend the previously sparse literature in this area, which has found no change in needs frustration/thwarting variables over a season when assessed in soccer players (Balaguer et al., 2012) and adolescent athletes (Martinet, Guillet-Descas, & Moiret, 2015). Perceptions of needs frustration are believed to be associated with poorer quality motivation and diminished performance and wellness (Deci & Ryan, 2000) and, within the current study, it was therefore anticipated that higher levels of needs frustration over time would coincide with lower levels of functioning. Indeed, this suggestion was supported with individuals in the “*High to Low Needs Frustration*” class given a 60.5% chance of residing in the “*Low Stable Functioning*” class, and individuals in the “*Below Average Stable Needs Frustration*” class assigned an 84.2% of chance of being allocated to the “*Above Average Stable Functioning*” class. However, this pattern did not follow for the “*Low to High Needs Frustration*” class with participants given a 100% chance of being in the “*Above Average Stable Functioning*” class, rather than the anticipated “*High to Low Functioning*” class. This finding therefore suggests that the lowest levels of needs frustration may not coincide with high-level functioning (i.e., thriving) but, instead, that some level of needs frustration may be present. Although this finding opposes traditional beliefs in BPNT (Deci & Ryan, 2000) and research does not currently exist to explain why feeling incompetent, controlled, and alienated may relate to functioning *within* the same event that these negative perceptions occur, some suggestions may be inferred from literature that has considered the positive reactions displayed *following* a negative event (e.g., Collins & MacNamara, 2012; Sarkar, Fletcher, & Brown, 2015; Tamminen, Holt, & Neely, 2013). For example, within Sarkar et al. (2015), participants described how feelings of wrongdoing drove them on in their performance development. Within the current study, it may have been that low levels of these negative feelings had an immediate effect on motivation, increased effort, and, ultimately, the level of functioning

achieved.

Notwithstanding the novel findings of the current study, it is necessary to identify the study limitations and areas for future improvement. First, owing to the small numbers of participants included in the *high to low functioning* ($n = 4$), *high to low needs satisfaction* ($n = 3$), and *low to high needs frustration* ($n = 6$) classes, readers should interpret the relationships with these classes cautiously. A second limitation was that only linear growth curve models were fitted to the data in the current study due to the lengthy time between, and limited number of, data points. It is suggested, therefore, that future research on this topic collects data more frequently, and at more regular intervals during a season, so that alternative growth curve models can be fit to the data to elicit greater interpretation of the types of change observed (see, Ram & Grimm, 2007; Sterba, 2014). Third, although the use of longitudinal data collection enabled patterns in functioning to be matched with patterns in the basic need variables, the dual trajectory LCGA did not allow for the interpretation of causality. Hence, levels on the basic need variables may have predicted functioning, or functioning may have predicted basic need satisfaction and frustration. In order to disentangle this relationship, future analysis would need to be conducted with data collected at discrete time-points. Fourth, the results from the dual trajectory LCGAs with needs satisfaction and needs frustration, and functioning, suggest that other variables need to be considered when examining thriving in sport performers. In doing so, researchers would do well to consider alternative basic fundamental processes (e.g., stress) and possible predictors (e.g., challenge appraisal) that have previously been suggested to relate to thriving (see, Brown, Arnold, Fletcher, et al., in press; Chapter 2). Fifth, a cautionary note is necessary when interpreting the results from the needs frustration subscales as, on occasions, the Cronbach's alpha values fell below the acceptable cut-off point (.70; Kline, 1998), therefore suggesting the scales may have low reliability. Lastly, it is important to note that some participants' level of sporting representation altered over the time-points as individuals moved between teams (e.g., junior to senior; club to regional), and we were unable to conduct analysis on such changes as a result of their idiosyncratic nature. Owing to the self-referenced nature of assessment, it was anticipated that performers would gauge their level of functioning based on their personal expectations at each given competitive level and, thus, the changes in representation would not deleteriously impact the longitudinal assessment of

functioning. That said, it may be of interest for future research to investigate whether thriving at one level, can help you subsequently thrive at a higher or lower level.

A possible implication of the current study for applied practice is the need to identify the triggers of change in functioning in sport performers. More specifically, developing an understanding of the potential causes for high functioning performers to significantly decrease their functioning may enable this pattern to be reversed. Furthermore, identifying key triggers may also enable above average stable and low stable performers to increase their functioning levels. One approach for this could be the use of post-match questioning and feedback (see, e.g., Mesagno, Hill, & Larkin, 2015), as this would elicit and accelerate learning from encounters experienced. A further practical implication from the findings is that environments that create the highest perceptions of needs satisfaction and lowest perceptions of needs frustration, may not necessarily result in the highest levels of functioning in sport performers. Instead, it is suggested that practitioners and coaches maximize athletes' perceptions of needs satisfaction, but may also need to maintain a small level of needs frustration, as well as considering other process variables (e.g., athletes' appraisals) that may help to maximize functioning and increase a performer's chances of thriving over time in competitive sport.

The current study provides the first longitudinal assessment of sport performers' functioning (i.e., performance and well-being) over time. The study rigorously identified three growth trajectories for sport performers' functioning, and suggested that performers' functioning was stable at moderate and low levels, but not at high levels. Future inquiry is required to further substantiate these trajectories classes, whilst also exploring how sport performers can sustain high levels of functioning. Furthermore, the results provide evidence to suggest that, whilst basic psychological needs satisfaction and frustration variables are related to thriving, the direction of these relationships require examination, and other variables need to be considered when predicting thriving in sport performers. Practitioners, coaches, and any sporting personnel tasked with facilitating thriving in sport performers, are suggested to first identify triggers of upward change in functioning and second to create opportunities to disrupt and increase otherwise stable functioning to, ultimately, encourage thriving in sport.

4.6 Reference List

- Adie, J. W., Duda, J. L., & Ntoumanis, N. (2012). Perceived coach-autonomy support, basic need satisfaction and the well- and ill-being of elite youth soccer players: A longitudinal investigation. *Psychology of Sport and Exercise, 13*, 51-59. doi:10.1016/j.psychsport.2011.07.008
- Asparouhov, T., & Muthén, B. (2014). Auxiliary variables in mixture modeling: Three-step approaches using Mplus. *Structural Equation Modeling: A Multidisciplinary Journal, 21*, 329-341. doi:10.1080/10705511.2014.915181
- Balaguer, I., González, L., Fabra, P., Castillo, I., Mercé, J., & Duda, J. L. (2012). Coaches' interpersonal style, basic psychological needs and the well- and ill-being of young soccer players: A longitudinal analysis. *Journal of Sports Sciences, 30*, 1619-1629. doi:10.1080/02640414.2012.731517
- Benson, P. L. (2002). Adolescent development in social and community context: A program of research. *New Directions for Youth Development, 2002*, 123-148. doi:10.1002/ym.19
- Berlin, K. S., Parra, G. R., & Williams, N. A. (2014). An introduction to latent variable mixture modeling (part 2): Longitudinal latent class growth analysis and growth mixture models. *Journal of Pediatric Psychology, 39*, 188-203. doi:10.1093/jpepsy/jst085
- Bowen, H. P., & Wiersema, M. F. (1999). Matching method to paradigm in strategy research: Limitations of cross-sectional analysis and some methodological alternatives. *Strategic Management Journal, 20*, 625-636.
- Brown, D. J., Arnold, R., Fletcher, D., & Standage, M. (in press). Human thriving: A conceptual debate and literature review. *European Psychologist*.
- Brown, D. J., Arnold, R., Reid, T., & Roberts, G. (2017). *A qualitative inquiry of thriving in elite sport*. Manuscript submitted for publication.
- Brown, D. J., Arnold, R., Standage, M., & Fletcher, D. (2017). *Thriving on pressure: A factor mixture analysis of sport performers' responses to competitive sporting encounters*. Manuscript submitted for publication.
- Carpentier, J., & Mageau, G. A. (2013). When change-oriented feedback enhances motivation, well-being and performance: A look at autonomy-supportive feedback in sport. *Psychology of Sport and Exercise, 14*, 423-435. doi:10.1016/j.psychsport.2013.01.003

- Chen, B. W., Vansteenkiste, M., Beyers, W., Boone, L., Deci, E. L., Van der Kaap-Deeder, J., . . . Verstuyf, J. (2015). Basic psychological need satisfaction, need frustration, and need strength across four cultures. *Motivation and Emotion, 39*, 216-236. doi:10.1007/s11031-014-9450-1
- Chen, F. F. (2007). Sensitivity of goodness of fit indices to lack of measurement invariance. *Structural Equation Modeling: A Multidisciplinary Journal, 14*, 464-504. doi:10.1080/10705510701301834
- Cheon, S. H., Reeve, J., Lee, J., & Lee, Y. (2015). Giving and receiving autonomy support in a high-stakes sport context: A field-based experiment during the 2012 London Paralympic Games. *Psychology of Sport and Exercise, 19*, 59-69. doi:10.1016/j.psychsport.2015.02.007
- Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling: A Multidisciplinary Journal, 9*, 233-255. doi:10.1207/S15328007SEM0902_5
- Collins, D., & MacNamara, Á. (2012). The rocky road to the top: Why talent needs trauma. *Sports Medicine, 42*, 907-914. doi:10.1007/BF03262302
- Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11*, 227-268. doi:10.1207/S15327965PLI1104_01
- Donaldson, S. I., Dollwet, M., & Rao, M. A. (2015). Happiness, excellence, and optimal human functioning revisited: Examining the peer-reviewed literature linked to positive psychology. *The Journal of Positive Psychology, 10*, 185-195. doi:10.1080/17439760.2014.943801
- Frost, R. O., Marten, P., Lahart, C., & Rosenblate, R. (1990). The dimensions of perfectionism. *Cognitive Therapy and Research, 14*, 449-468. doi:10.1007/bf01172967
- Galli, N., & Reel, J. J. (2012). 'It was hard, but it was good': A qualitative exploration of stress-related growth in Division I intercollegiate athletes. *Qualitative Research in Sport, Exercise and Health, 4*, 297-319. doi:10.1080/2159676X.2012.693524
- Galli, N., & Vealey, R. S. (2007). Thriving in the face of adversity: Applying the resiliency model to high-level athletes. *Journal of Sport & Exercise Psychology, 29*, S162-S163.
- Galli, N., & Vealey, R. S. (2008). "Bouncing back" from adversity: Athletes'

- experiences of resilience. *The Sport Psychologist*, 22, 316-335.
- Geiser, C. (2012). *Data analysis with Mplus*. New York, NY: Guilford Press Publications.
- Grimm, K. J., & Ram, N. (2009). A second-order growth mixture model for developmental research. *Research in Human Development*, 6, 121-143. doi:10.1080/15427600902911221
- Gucciardi, D. F., Hanton, S., Gordon, S., Mallett, C. J., & Temby, P. (2015). The concept of mental toughness: Tests of dimensionality, nomological network, and traitness. *Journal of Personality*, 83, 26-44. doi:10.1111/jopy.12079
- Gucciardi, D. F., Jackson, B., Hodge, K., Anthony, D. R., & Brooke, L. E. (2015). Implicit theories of mental toughness: Relations with cognitive, motivational, and behavioral correlates. *Sport, Exercise, and Performance Psychology*, 4, 100-112. doi:10.1037/spy0000024
- Gucciardi, D. F., & Jones, M. I. (2012). Beyond optimal performance: Mental toughness profiles and developmental success in adolescent cricketers. *Journal of Sport & Exercise Psychology*, 34, 16-36.
- Jackson, S. A., & Roberts, G. C. (1992). Positive performance states of athletes: Toward a conceptual understanding of peak performance. *The Sport Psychologist*, 6, 156-171.
- Jung, T., & Wickrama, K. A. S. (2008). An introduction to latent class growth analysis and growth mixture modeling. *Social and Personality Psychology Compass*, 2, 302-317. doi:10.1111/j.1751-9004.2007.00054.x
- Kahneman, D., Diener, E., & Schwarz, N. (Eds.). (1999). *Well-being: Foundations of hedonic psychology*. New York, NY: Russell Sage Foundation.
- Kline, R. B. (1998). *Principles and practice of structural equation modeling*. New York, NY: Guilford Publications.
- Louvet, B., Gaudreau, P., Menaut, A., Genty, J., & Deneuve, P. (2007). Longitudinal patterns of stability and change in coping across three competitions: A latent class growth analysis. *Journal of Sport & Exercise Psychology*, 29, 100-117.
- Martinent, G., & Decret, J.-C. (2015). Coping profiles of young athletes in their everyday life: A three-wave two-month study. *European Journal of Sport Science*, 15, 736-747. doi:10.1080/17461391.2015.1051131
- Martinent, G., Guillet-Descas, E., & Moiret, S. (2015). A reciprocal effects model of the temporal ordering of basic psychological needs and motivation. *Journal*

- of Sport & Exercise Psychology*, 37, 117-126. doi:10.1123/jsep.2014-0093
- Martinent, G., & Nicolas, M. (2016). A latent profile transition analysis of coping within competitive situations. *Sport, Exercise, and Performance Psychology*, 5, 218-231. doi:10.1037/spy0000062
- Mesagno, C., Hill, D. M., & Larkin, P. (2015). Examining the accuracy and in-game performance effects between pre- and post-performance routines: A mixed methods study. *Psychology of Sport and Exercise*, 19, 85-94. doi:10.1016/j.psychsport.2015.03.005
- Muthén, L. K., & Muthén, B. O. (2015a). Mplus (Version 7.4). Los Angeles, CA: StatModel.
- Muthén, L. K., & Muthén, B. O. (2015b). *Mplus user's guide* (7th ed.). Los Angeles, CA: Muthén & Muthén.
- Nagin, D. S., & Tremblay, R. E. (2001). Analyzing developmental trajectories of distinct but related behaviors: A group-based method. *Psychological Methods*, 6, 18-34. doi:10.1037/1082-989X.6.1.18
- Ng, J. Y. Y., Lonsdale, C., & Hodge, K. (2011). The Basic Needs Satisfaction in Sport Scale (BNSSS): Instrument development and initial validity evidence. *Psychology of Sport and Exercise*, 12, 257-264. doi:10.1016/j.psychsport.2010.10.006
- Nylund-Gibson, K., Grimm, R., Quirk, M., & Furlong, M. (2014). A latent transition mixture model using the three-step specification. *Structural Equation Modeling: A Multidisciplinary Journal*, 21, 439-454. doi:10.1080/10705511.2014.915375
- Pensgaard, A. M., & Duda, J. L. (2003). Sydney 2000: The interplay between emotions, coping, and the performance of Olympic-level athletes. *The Sport Psychologist*, 17, 253-267.
- Privette, G. (1982). Peak performance in sports: A factorial topology. *International Journal of Sport Psychology*, 13, 242-249.
- Ram, N., & Grimm, K. (2007). Using simple and complex growth models to articulate developmental change: Matching theory to method. *International Journal of Behavioral Development*, 31, 303-316. doi:10.1177/0165025407077751
- Reinboth, M., & Duda, J. L. (2006). Perceived motivational climate, need satisfaction and indices of well-being in team sports: A longitudinal

- perspective. *Psychology of Sport and Exercise*, 7, 269-286.
doi:10.1016/j.psychsport.2005.06.002
- Reinboth, M., Duda, J. L., & Ntoumanis, N. (2004). Dimensions of coaching behavior, need satisfaction, and the psychological and physical welfare of young athletes. *Motivation and Emotion*, 28, 297-313.
doi:10.1023/B:MOEM.0000040156.81924.b8
- Ryan, R. M., & Deci, E. L. (2002). An overview of self-determination theory: An organismic-dialectical perspective. In E. L. Deci & R. M. Ryan (Eds.), *Handbook of self-determination research* (pp. 3-33). Rochester, NY: University of Rochester Press.
- Ryan, R. M., & Frederick, C. (1997). On energy, personality, and health: Subjective vitality as a dynamic reflection of well-being. *Journal of Personality*, 65, 529-565. doi:10.1111/j.1467-6494.1997.tb00326.x
- Ryan, R. M., Huta, V., & Deci, E. L. (2008). Living well: A self-determination theory perspective on eudaimonia. *Journal of Happiness Studies*, 9, 139-170.
doi:10.1007/s10902-006-9023-4
- Sarkar, M., Fletcher, D., & Brown, D. J. (2015). What doesn't kill me...: Adversity-related experiences are vital in the development of superior Olympic performance. *Journal of Science and Medicine in Sport*, 18, 475-479.
doi:10.1016/j.jsams.2014.06.010
- Satorra, A., & Bentler, P. (1999). A scaled difference chi-square test statistic for moment structure analysis. Retrieved from
<http://statistics.ucla.edu/preprints/uclastat-preprint-1999:1919>.
- Spreitzer, G., & Porath, C. (2014). Self-determination as a nutriment for thriving: Building an integrative model of human growth at work. In M. Gagné (Ed.), *The Oxford handbook of work engagement, motivation, and self-determination theory* (pp. 245-258). New York, NY: Oxford University Press.
- Spreitzer, G., Sutcliffe, K., Dutton, J., Sonenshein, S., & Grant, A. M. (2005). A socially embedded model of thriving at work. *Organization Science*, 16, 537-549. doi:10.1287/orsc.1050.0153
- Stenling, A., Lindwall, M., & Hassmén, P. (2015). Changes in perceived autonomy support, need satisfaction, motivation, and well-being in young elite athletes. *Sport, Exercise, and Performance Psychology*, 4, 50-61.

doi:10.1037/spy0000027

- Sterba, S. K. (2014). Fitting nonlinear latent growth curve models with individually varying time points. *Structural Equation Modeling: A Multidisciplinary Journal*, 21, 630-647. doi:10.1080/10705511.2014.919828
- Stoeber, J. (2011). The dual nature of perfectionism in sports: Relationships with emotion, motivation, and performance. *International Review of Sport and Exercise Psychology*, 4, 128-145. doi:10.1080/1750984X.2011.604789
- Tamminen, K. A., Holt, N. L., & Neely, K. C. (2013). Exploring adversity and the potential for growth among elite female athletes. *Psychology of Sport and Exercise*, 14, 28-36. doi:10.1016/j.psychsport.2012.07.002
- Thompson, E. R. (2007). Development and validation of an internationally reliable short-form of the Positive and Negative Affect Schedule (PANAS). *Journal of Cross-Cultural Psychology*, 38, 227-242. doi:10.1177/0022022106297301
- Warren, M. T., Wray-Lake, L., Rote, W. M., & Shubert, J. (2016). Thriving while engaging in risk? Examining trajectories of adaptive functioning, delinquency, and substance use in a nationally representative sample of U.S. adolescents. *Developmental Psychology*, 52, 296-310. doi:10.1037/a0039922

Closing Commentary

In previous sections of this thesis, questions were posed with regards the lasting and potentially cumulative effect of thriving (see Section 2.5), and whether long-term patterns of functioning exist (see Section 3.5); the findings reported in this Chapter go some way to answering these questions. Specifically, the identification of a *High to Low Functioning* growth trajectory suggests that, for a small number of participants in the sample of sport performers recruited, initial experiences of thriving had a negative lasting effect on functioning. Furthermore, by describing the *High to Low Functioning*, *Above Average Stable Functioning*, and *Low Stable Functioning* growth trajectories, the findings in this study provide initial evidence for the long-term patterns of functioning apparent in sport performers.


In the study presented within this Chapter, growth trajectories were also described for performers' perceptions of satisfaction and frustration of basic psychological needs. These variables have previously been suggested to be associated with thriving (see, Chapter 3; see also, Sheldon, 2009; Spreitzer & Porath, 2014), and a purpose of this study was to examine how changes in perceptions of psychological needs coincided with changes in functioning. The findings revealed that basic psychological needs satisfaction and frustration corresponded with functioning at average and low levels, but neither needs satisfaction nor needs frustration had robust relationships with high-level functioning. It therefore appeared necessary for the studies reported in Chapters 5 and 6 to expand the fundamental human processes (e.g., stress) and variables (e.g., athletes' appraisals) considered in attempting to understand thriving.

Chapter 5. The Prediction of Thriving in Elite Athletes: An Exploration of Potential Process Variables and Salivary Biomarkers

Introductory Commentary

The findings presented in Chapters 3 and 4 suggest that a relationship exists between sport performers' satisfaction of basic psychological needs (BPNS) and their in-match functioning. However, the results from Chapter 4 also indicated that BPNS did not have a robust relationship with thriving and, therefore, that other variables need to be considered. One such variable that has previously been suggested to relate to thriving is challenge appraisal (see Chapter 2; see also, Carver, 1998). According to the transactional model of stress (Lazarus & Folkman, 1984), a challenge appraisal is made when an individual perceives an encounter as an opportunity for growth and gain. Thus, challenge appraisals encourage task engagement and create opportunities for positive change and, ultimately, thriving. Although the results from the study reported in Chapter 3 did not demonstrate a predictive effect of challenge appraisal on the likelihood of profile membership, the adaptive nature of these judgments has been supported in sports settings (e.g., Doron & Martinent, 2016; Freeman & Rees, 2009; Skinner & Brewer, 2004). It appears, therefore, further inquiry is needed into the roles of BPNS and challenge appraisal on thriving. Within this Chapter, these predictive relationships are examined using a prospective diary design. This approach advanced the longitudinal study reported in Chapter 4 as it enabled performers' match experiences to be disentangled from their pre-match perceptions, whilst also allowing levels of BPNS and challenge appraisal to be examined in the days leading up to the sporting encounter.

The studies reported thus far in the thesis have assessed the psychological nature of thriving. To further advance understanding of thriving in sport performers, the study reported herein sought to explore the suggestion that thriving could be predicted through an individual's hormonal responses to a stressful situation (cf. Epel, McEwen, & Ickovics, 1998). In line with previous thriving research (Epel et al., 1998; Mendes, Gray, Mendoza-Denton, Major, & Epel, 2007), this study examined cortisol reactivity and anabolic balance (the ratio of anabolic and catabolic hormones) as possible biomarkers of thriving.

This declaration concerns the article entitled:									
The Prediction of Thriving in Elite Athletes: An Exploration of Potential Process Variables and Salivary Biomarkers									
Publication status (tick one)									
draft manuscript	<input checked="" type="checkbox"/>	Submitted	<input type="checkbox"/>	In review	<input type="checkbox"/>	Accepted	<input type="checkbox"/>	Published	<input type="checkbox"/>
Publication details (reference)	Brown, D. J., Arnold, R., Standage, M., Turner, J. E., & Fletcher, D. (2017). <i>The prediction of thriving in elite athletes: An exploration of potential process variables and salivary biomarkers</i> . Manuscript in preparation.								
Candidate's contribution to the paper (detailed, and also given as a percentage).	<p>Formulation of ideas: The candidate was predominantly responsible for the conceptualization of the paper, the identification of variables for investigation, and the formulation of original hypotheses. Candidate contribution = 75%</p> <p>Design of methodology: The candidate considerably contributed to the design of methodology used in the study, the identification of suitable measures, and selection of data analysis techniques. Candidate contribution = 75%</p> <p>Experimental work: The candidate was responsible for the collection of all data in the study and for running the analyses. J. E. Turner demonstrated and provided supervision for the salivary biomarker assays. Candidate contribution = 85%</p> <p>Presentation of data in journal format: The candidate drafted the manuscript in its entirety and formatted it according to journal specifications. The remaining authors read revisions of the manuscript and provided comments accordingly. Candidate contribution = 80%</p>								
Statement from Candidate	This paper reports on original research I conducted during the period of my Higher Degree by Research candidature.								
Signed							Date	24/04/2017	

Evidence of permission to use published paper: N/A.

Data access statement: To be provided following the acceptance of the manuscript in a journal.

5.1 Abstract

Thriving (i.e., high-level functioning) represents the most adaptive response to sporting encounters, and previous research with sport performers has suggested possible relationships between thriving and two process variables (viz., basic psychological needs satisfaction (BPNS), challenge appraisal). The purpose of this study was to examine these predictive relationships, and investigate whether salivary biomarkers of thriving can be established. Fifty-one elite male hockey players ($M_{age} = 24.94$ years, $SD_{age} = 4.73$; $M_{competing} = 16.89$ years, $SD_{competing} = 5.92$) completed a diary survey over seven consecutive days prior to a match and a saliva collection protocol on the day of the match. Functioning was assessed using indices for performance and well-being following the match, and saliva was assayed for the hormones cortisol and dehydroepiandrosterone. No associations were identified between the salivary hormones and functioning. Latent growth curve modelling revealed pre-game levels of BPNS and challenge appraisal positively predicted in-game functioning. In addition to providing further evidence to support these predictive relationships in sport, these findings offer an exciting avenue through which practitioners may look to facilitate thriving in sport performers.

5.2 Introduction

The quantity and variety of demands that make elite sport a highly pressurized environment are well documented in previous literature (see, for a review, Arnold & Fletcher, 2012; Sarkar & Fletcher, 2014). Much is also known about how athletes may respond when experiencing these demands (see, e.g., Gaudreau, Nicholls, & Levy, 2010; Jones, 1995). However, only recently has scientific inquiry begun to examine why it is that some athletes thrive on these demands where others only manage or succumb to them (see, e.g., Brown, Arnold, Standage, & Fletcher, 2017a; see Chapter 4). In this research, human thriving has been defined as “the joint experience of development and success, which can be realized through effective holistic functioning and observed through the experience of a high-level of well-being and a perceived high-level of performance” (Brown, Arnold, Fletcher, & Standage, in press, p. 22; see Chapter 2, p. 24). Turning from the definition of thriving to its observable characteristics in elite sport performers, these have been identified as, amongst other factors, an individual excelling, experiencing enjoyment, and sensations of physical difference (Brown, Arnold,

Reid, & Roberts, 2017). The adaptive and highly desirable nature of these features in elite sport make thriving a fundamental construct for examination in research and facilitation in practice.

Initial examinations of thriving in sport have begun to examine its personal and contextual enablers (Brown, Arnold, Standage, & Fletcher, 2017b; see Chapter 3), process variables suggested to link enablers to thriving (Brown, Arnold, et al., 2017a, 2017b; see Chapters 3 and 4), and possible relationships with other constructs (e.g., mental toughness; Gucciardi, Jackson, Hodge, Anthony, & Brooke, 2015). For example, in their investigation of sport performers' responses to competition, Brown, Arnold et al. (2017b; see Chapter 3) revealed that the likelihood of athletes being allocated to a thriving group was predicted by their reported higher levels of personal resilient qualities and psychological skills use. Furthermore, profile membership was predicted by higher levels of basic psychological needs satisfaction (hereafter, BPNS; Brown, Arnold, et al., 2017b; see Chapter 3). Brown, Arnold, et al. (2017a; see Chapter 4) subsequently advanced their earlier explorative analysis by simultaneously monitoring fluctuations in sport performers' levels of BPNS and functioning over time. Results from dual trajectory latent class growth analysis (see, e.g., Warren, Wray-Lake, Rote, & Shubert, 2016) suggested that BPNS levels corresponded with functioning at average and low levels, but were not a robust correlate for high-level functioning. Although these studies provide an important initial understanding of thriving in an athletic population, the retrospective design of the research may impair accurate representation of the enablers and process variables proposed to determine whether or not thriving occurs. To illustrate, completing an assessment of pre-match BPNS after the encounter may be influenced by the match outcome (i.e., winning or losing). Furthermore, by collecting basic needs and functioning data within the same questionnaire, it was not possible to ascertain the direction of the relationships between the variables (i.e., whether basic need satisfaction predicts thriving, or whether thriving predicts basic need satisfaction). To extend and advance these existing studies, therefore, research is required which conducts discrete assessments of enabler and process variables before a match, and of outcome variables following the encounter.

In addition to separating the assessment of predictor (i.e., enabler or process) and outcome variables, the findings of Brown, Arnold, et al. (2017a; see Chapter 4) suggest that it is important for thriving research to consider additional variables,

alongside BPNS, when predicting functioning in sport performers. One such variable previously elucidated in the extant thriving literature is challenge appraisal (see, Brown, Arnold, Fletcher, et al., in press; Chapter 2; see also, Carver, 1998; O'Leary & Ickovics, 1995). Challenge appraisal is a form of evaluation cast by an individual when perceiving a situational as stressful (Lazarus & Folkman, 1984). More specifically, Lazarus and Folkman (1984) suggested that a challenge appraisal is made when an individual perceives that a situation has a potential for gain or growth. The adaptive nature of challenge appraisals has been extensively examined within a sport setting, with studies identifying positive effects on athletes' performances (see, e.g., Doron & Martinent, 2016b; Fletcher & Sarkar, 2012; Freeman & Rees, 2009) and emotions (Skinner & Brewer, 2004). Although assessing BPNS and challenge appraisal immediately prior to a sporting encounter would make a significant contribution to the thriving literature, recent research has suggested that changes in psychological and social variables in the days leading up to a sporting competition can provide a critical insight into explaining successful performances (Boat & Taylor, 2015). Therefore, tracking athletes' perceptions of BPNS and challenge appraisal in the week prior to competition, may offer a more comprehensive and appropriate examination of the associations between the process variables and athletes' experiences of in-game thriving.

A further limitation of the previous literature on thriving in sport is the sole use of self-report data, as this can increase the risk of method biases impacting results and subsequent conclusions (cf. Podsakoff, MacKenzie, & Podsakoff, 2012). For example, such bias may arise from item structure or wording inducing similar responses, or from similarities in the medium in which measures are collected (Edwards, 2008). One approach that could be used to overcome these biases in thriving research, would be to implement a mixed methods design, whereby subjective self-report data is collected alongside objective physiological data, such as measuring hormones in saliva as potential thriving biomarkers (cf. Piazza, Almeida, Dmitrieva, & Klein, 2010). Initial suggestions for more objective measurements of thriving were first proposed by Epel, McEwen, and Ickovics (1998) who espoused that physical thriving could be investigated through an individual's hormonal responses to a stressful situation. More specifically, thriving was suggested to occur when a greater amount of anabolic (i.e., restorative) hormones, rather than catabolic (i.e., destructive) hormones, were secreted in a stress response (Epel et al., 1998).

Anabolic and catabolic hormones are typically released as products of hypothalamic-pituitary-adrenocortical (HPA) axis activation via the action of adrenocorticotrophic hormone (ACTH) on the adrenal cortex (cf. Mendes, Gray, Mendoza-Denton, Major, & Epel, 2007; Shier, Butler, & Lewis, 2015). Although the secretion of both anabolic and catabolic hormones has adaptive effects when faced with the challenges of daily life, long term activation of the HPA axis and release of catabolic hormones can have negative implications for health (McEwen, 2003). To this end, the notion of deriving a ratio for the release of catabolic and anabolic hormones (the so-called “anabolic balance”) has been utilized within the literature to examine susceptibility to disease, stress, and ageing (e.g., Heaney, Carroll, & Phillips, 2014; Mendes et al., 2007; Morgan et al., 2004; Taylor et al., 2012).

Two hormones are typically examined to assess anabolic balance: cortisol (catabolic) and dehydroepiandrosterone (DHEA; anabolic). Cortisol is a glucocorticoid released from the adrenal cortex and has been shown to influence metabolism and immunity (cf. Carrasco & Van de Kar, 2003). Cortisol release has a diurnal rhythm which is characterized by a rapid increase upon waking, with a peak about 30-45 minutes later, and a gradual decline over the remainder of the day; reaching a nadir around midnight (Hucklebridge, Hussain, Evans, & Clow, 2005). Secretion of cortisol is increased acutely in response to stressors and this hormone is believed to be an important component in the stress response through its role in diverting energy away from non-essential bodily functions, and redirecting resources by stimulating processes associated with survival (Dickerson & Kemeny, 2004; Sapolsky, Romero, & Munck, 2000). Both the acute response to stressors, but most significantly, the cortisol awakening response can become impaired following extended or repeated exposure to chronic stressors (see, e.g., Duan et al., 2013; Viena, Banks, Barbu, Schulman, & Tartar, 2012). This can result in an overall flattened cortisol awakening response and, therefore, a greater overall exposure to cortisol throughout the day. Within the extant thriving research, Epel et al. (1998) have argued that the dampening of the acute cortisol response to an acute stressor may be associated with thriving, as a reduced response would demonstrate an individual’s habituation and ability to cope with the demand.

DHEA and its sulphated metabolite, DHEA-S, are other steroid hormones that are co-released with cortisol from the adrenal cortex in response to ACTH (Reisch, Slawik, Zwermann, Beuschlein, & Reincke, 2005). Secretion of DHEA

follows a diurnal rhythm with levels greatest in the morning after awakening, and then declining throughout the afternoon and evening (Hucklebridge et al., 2005). DHEA acts as a circulatory precursor to androgens and oestrogens and is believed to have salutary effects on immune function and well-being (Buford & Willoughby, 2008; Maninger, Wolkowitz, Reus, Epel, & Mellon, 2009). Much of the extant literature that has investigated the effects of salivary DHEA in humans, including the sole investigation on thriving (viz. Mendes et al., 2007), has examined concentrations of DHEA-S, rather than DHEA. Although steroid hormones such as cortisol and DHEA can diffuse freely into saliva, DHEA-S is affected by salivary flow rate (Vining, McGinley, & Symons, 1983), which studies typically fail to control for (see, e.g., Ghiciuc et al., 2011; Mendes et al., 2007). Despite the potential benefits that could be gained from examining sport performers' anabolic responses to stress, it is noticeable that studies examining the ratio of anabolic (e.g., DHEA) and catabolic (e.g., cortisol) hormones are yet to be conducted in sport. Furthermore, very few studies have been conducted that examine physiological aspects of thriving since it was initially forwarded by Epel et al. in 1998.

The aim of the current study was to examine whether predictive relationships existed between potential process variables for thriving and thriving itself (i.e., high-level functioning) in elite athletes, and to examine whether salivary biomarkers can be defined that predict thriving. Specifically, the study aimed to investigate whether change in perceptions of BPNS and challenge appraisal predicted in-game functioning. In addition, the study aimed to explore whether cortisol exposure, pre-game cortisol concentration, pre-game DHEA concentration, and the ratio of salivary DHEA:cortisol collected in a pre-game sample were related to functioning.

5.3 Method

5.3.1 Participants

Fifty-one elite male field hockey players ($M_{age} = 24.94$ years, $SD_{age} = 4.73$) were recruited from three teams to take part in this study. Participants had an average of 16.89 ($SD = 5.92$) years' experience playing hockey. Thirty eight of the participants had played hockey at either a junior or senior international level, and all players were currently playing at either premier division level or higher. All playing positions were represented (i.e., goalkeepers, defenders, midfielders, and forwards).

5.3.2 Study Design and Overview of Procedures

This study utilized a combination of diary and cross-sectional methods. Following institutional ethical approval, coaches of elite hockey teams were contacted to inform them about the study and to invite them to consider their teams' involvement. Where coaches agreed to be involved, a target fixture was identified, and a mutually convenient time was arranged for the researcher to address the players, invite them to participate in the study, and for the players to provide their informed consent. Six days prior to the target fixture, participants were e-mailed a hyperlink to an electronic copy of the multi-section questionnaire (see Measures section below) and asked to complete it in relation to how they felt at that time with regards to their involvement in hockey. This questionnaire was completed on-line on each of the next five evenings and in paper format when participants arrived at the venue prior to the match. Electronic prompts were sent to participants via SMS text messages to enhance completion rates. At least 48 hours prior to the fixture, participants were provided with a pack of four saliva collection tubes labelled with the match day sampling times, a waist-worn accelerometer (see Measures section below), and a diary to record their sleep, wake, and saliva collection times. Saliva samples were provided by participants on the day of the match immediately upon waking, and then + 0.5 hours ($M = 00:29$, $SD = 00:01$), + 3 hours ($M = 02:57$, $SD = 00:23$), and + 5.25 hours ($M = 05:18$, $SD = 00:35$). The + 5.25 hours sample was time-matched with the pre-game questionnaire. The saliva collection tubes, accelerometer, and diary were collected from participants when they arrived at the venue for the fixture, and upon collection, participants were asked whether they had adhered to the protocol. Participants who had not followed the protocol were excluded from the salivary analyses. Following the match, participants completed a final questionnaire (see Measures section below) in paper format to assess their functioning during the game. Each of the questionnaires completed by the participants took approximately 5 minutes to complete.

5.3.3 Measures

5.3.3.1 Functioning

In accordance with previous literature (Brown, Arnold, et al., 2017a, 2017b; see Chapters 3 and 4), sport performers' competitive functioning was assessed using scores obtained for subjective performance and well-being. Subjective performance

was determined by asking performers to rate their satisfaction with their performance in the match on an 11-point Likert-type scale (0 = *totally dissatisfied*, 10 = *totally satisfied*) (cf. Pensgaard & Duda, 2003). Positive affect was used as a marker of hedonic well-being (cf. Kahneman, Diener, & Schwarz, 1999) and was assessed using the International Positive and Negative Affect Schedule Short Form (I-PANAS-SF; Thompson, 2007). Specifically, participants reported the regularity with which they experienced five emotional descriptors (e.g., determined, inspired) during the match on a five-point scale (1 = *never*, 5 = *always*). Cronbach's alpha value for the I-PANAS-SF in the present study was .71. Subjective vitality was used as an indicator of eudaimonic well-being (cf. Ryan, Huta, & Deci, 2008), and was assessed using the Subjective Vitality Scale (SVS; Ryan & Frederick, 1997). Specifically, participants responded to four items from the SVS measuring the accuracy of the statement with their experience of aliveness and energy in the encounter on a six-point scale (1 = *not at all true*, 6 = *very true*). Cronbach's alpha for the SVS was excellent in the present study (.91). The factor loadings for subjective performance, subjective vitality, and positive affect on functioning were .64, .99, and .76, respectively.

5.3.3.2 Process variables

The multi-section questionnaire contained brief scales to assess challenge appraisal and BPNS. Challenge appraisal was assessed using the two-item version of McGregor and Elliot's (2002) task construal measure. Participants responded to the two items on a 1 (*not at all true of me*) to 7 (*very true of me*) Likert-type scale. The scale demonstrated excellent internal consistency in the present study (median Cronbach's alpha across timepoints = .91). BPNS was assessed using the Basic Needs Satisfaction in Sport Scale (BNSSS; Ng, Lonsdale, & Hodge, 2011). The full BNSSS contains 16 items so, in order to reduce the daily burden placed on participants, one item was selected to assess participants' satisfaction on each of autonomy, competence, and relatedness scales. To identify the items that provided the most information on these variables, item response theory analysis (Drasgow & Hulin, 1990; Harvey & Hammer, 1999) was conducted on responses previously collected from 535 sport performers (see Appendix Two). The median internal consistency for the composite score for BPNS from the three items selected was .75.

5.3.3.3 Salivary cortisol and DHEA

Saliva was collected by the passive drool technique (3 minute collection) into pre-weighted centrifuge tubes (Fisherbrand™; Fisher Scientific, Loughborough, UK). The passive drool technique (Navazesh, 1993) involved participants allowing saliva to accumulate in the floor of their mouths in an “unstimulated” manner (i.e., without chewing or moving their tongue around to stimulate saliva flow). Then every minute, for a total of three minutes, they were asked to spit the saliva into the tube. Participants were requested not to eat, drink, or brush their teeth in the hour prior to providing the sample (cf. Kivlighan et al., 2004; Stalder et al., 2016). Tubes were centrifuged at $2000 \times g$ for 10 minutes to remove particulate matter, and the saliva was aliquoted into microcentrifuge tubes (Eppendorf, Hamburg, Germany) and stored at -20°C until assay.

Salivary cortisol and DHEA were analysed in duplicate using commercially available enzyme-linked immunosorbent assays (ELISAs) according to manufacturer instructions (Salimetrics, Newmarket, UK). Absorbance values were measured using a microplate reader (SPECTROstar Nano; BMG Labtech, Ortenberg, Germany). In addition to determining the concentration of cortisol and DHEA in the samples, exposure to cortisol over the course of the morning was calculated by quantifying the area under the curve (AUC_g) using the trapezoid method relative to ground (Pruessner, Kirschbaum, Meinlschmid, & Hellhammer, 2003). Furthermore, the ratio of DHEA:cortisol was calculated using data from the + 5.25 hours sample. This time point, where cortisol and DHEA would typically exhibit their lowest levels, was selected to assess any effect arising from anticipation of the match and to avoid artefacts brought about by diurnal fluctuations in these hormones; it is known that the magnitude of such diurnal change can be influenced by a number of physiological and psychological variables (Heaney et al., 2014).

5.3.3.4 Physical activity and sleep

In order to control for the potentially confounding effects of physical activity and sleep on cortisol and DHEA concentrations (cf. Hill et al., 2008; Kumari et al., 2009), participants wore an ActiGraph GT3X+ (ActiGraph LLC, Pensacola, FL) triaxial accelerometer around their waist for 24 hours prior to the match. Data were recorded at a sample frequency of 80 Hz and were downloaded using ActiLife software (ActiGraph, 2013). All acceleration data were processed using the default filter. To enable the computation of physical activity energy expenditure (kcal),

activity data and participants' self-reported body mass were entered into the Freedson VM3 Combination algorithm (Sasaki, John, & Freedson, 2011). In order to estimate sleep duration, participants recorded the time they went to bed on the night before each game and the time they woke up; which was entered into the Sadeh sleep scoring algorithm (Barreira et al., 2015; Sadeh, Sharkey, & Carskadon, 1994).

5.3.4 Data Analysis

Analyses were conducted using Mplus 7.4 (Muthén & Muthén, 2015) and SPSS 22 (IBM, 2013). The relationships between the psychological process variables and functioning were examined in a latent growth curve modelling framework in MPlus. The Full Information Maximum Likelihood Robust (MLR) estimation was used to account for any missing data and non-normality⁴. SPSS was used to conduct a repeated measures analysis of variance (ANOVA) assessment of changes in cortisol concentrations over time, and to examine the relationships between the salivary measurements and functioning using a multiple regression framework.

5.3.4.1 Longitudinal models

Latent growth curve modelling (LGM) was used to examine changes in BPNS and challenge appraisal in the week leading up to the competitive fixture, and the effect these changes had on functioning in the game. In LGM, change is typically specified through two growth factors: the intercept factor (i.e., the level of the outcome variable when the time variable equals zero) and the slope factor (i.e., the rate of change in the outcome variable; Preacher, Wichman, MacCallum, & Briggs, 2008). Within the present study, time was centred on match day and the intercept factor, therefore, represented the level of the psychological process variables reported immediately prior to the match.

The first step in the analysis was to ascertain the best fitting growth model for each of the psychological process variables. The first model tested was an intercept-only growth model that did not specify a slope factor. Next, a linear growth model was tested comprising intercept and slope growth factors. In the third model, a second slope growth factor was added to assess a quadratic shape and, in the fourth

⁴ Assessments of skewness and kurtosis suggested that data were kurtotic for subjective performance ($K = 2.40$); subjective vitality ($K = 3.80$); BPNS at the 1st ($K = 3.36$), 2nd ($K = 3.88$), 4th ($K = 2.51$), 6th ($K = 6.36$), and 7th ($K = 3.12$) time points; and challenge appraisal at the 2nd ($K = 4.46$), 5th ($K = 3.39$), 6th ($K = 2.93$), and 7th ($K = 2.50$) time points.

model, a third slope growth factor was added to examine the fit of a cubic change model. Models were compared using the Akaike's Information Criterion (AIC; Akaike, 1987) and the Bayesian Information Criterion (BIC; Schwartz, 1978), with smaller AIC and BIC values indicating a better fitting model (Hu & Bentler, 1995). Greater emphasis was placed on BIC values as this criterion assigns a greater penalty to model complexity compared to AIC and is, therefore, more appropriate for selecting parsimonious models (Arbuckle, 2007). Where a difference of < 2 BIC was identified between models, the difference was not considered worthy of mention (Kass & Raftery, 1995), and the model with the lower AIC was selected.

The second step in the analysis was to determine whether the latent growth factors for the psychological process variables predicted levels of functioning. Functioning scores were computed from a measurement model and then modelled as a manifest distal outcome variable in the growth models (cf. Muthén & Curran, 1997). Paths between the intercept and slope growth factors and the functioning outcome were tested for statistical significance. Model fit was determined using the Comparative Fit Index (CFI; Bentler, 1990), the Tucker Lewis Index (TLI; Tucker & Lewis, 1973), the Root Mean Square Error of Approximation (RMSEA; Steiger & Lind, 1980), and the Standardized Root Mean Square Residual (SRMR; Bentler, 1995). Acceptable values were close to or above .90 for CFI and .95 for TLI, and close to or below .08 for RMSEA and .05 for SRMR. When interpreting the latent growth models in respect to these statistics, values close to the guidelines were deemed acceptable as latent growth models are commonly acknowledged to display poor fit against conventional criteria (Preacher, 2010; Preacher et al., 2008).

5.3.4.2 Multiple regression

Multiple regression was used to assess the relationships between salivary variables (viz., cortisol exposure (AUC_g), pre-game cortisol and DHEA concentrations, ratio of DHEA:cortisol), and functioning, whilst controlling for the effects of known confounding variables (viz. age, preceding day physical activity, preceding night sleep duration). In order to correct for skewness and kurtosis within the data, log transformations were applied to the cortisol, DHEA:cortisol ratio, and physical activity data (Tabachnick & Fidell, 2013). Bivariate correlations were used to identify any significant associations between the physiological variables and functioning. Correlations of .1, .3, and .5 were interpreted as small, medium, and large, respectively (Cohen, 1988). Next, multiple regression analysis was conducted

with functioning entered as the dependent variable and the control variables entered in Step 1, and the salivary variables entered in Step 2. Separate analyses were conducted for each of the physiological variables. Adjusted R^2 values (which are less susceptible to low subject number per variable; Austin & Steyerberg, 2015) for the model specified in steps 1 and 2 were compared to determine whether the physiological variables explained any additional variance in functioning over and above that explained by the known confounding variables.

5.4 Results

5.4.1 Preliminary Analysis

Of the 51 participants that started the study, seven were excluded from the final data set because they either did not play in the fixture ($n = 5$) or they did not complete the post-match questionnaire to assess functioning ($n = 2$).

5.4.2 Process Variable Analysis

Descriptive statistics for the process variables can be seen in Table 5.1. The daily questionnaire completion rate for the 44 participants ranged from 65.9-100.0%, with missing data occurring at random.

5.4.2.1 BPNS

The fit indices for the intercept-only, linear, quadratic, and cubic BPNS growth models can be seen in Table 5.2. The intercept-only model was found to have the lowest BIC value (253.837) and was, therefore, selected as the best fitting growth model. The variance of the intercept (0.349, $p = .006$) indicates that there were statistically significant between-person differences in the level of perceived BPNS prior to the match. When functioning was added as a distal outcome to the intercept-only growth model, a significant positive regression path was found between the intercept growth factor and functioning (0.729, $p = .034$, see Table 5.3); therefore, suggesting that higher pre-game perceived BPNS was associated with higher levels of in-game functioning.

5.4.2.2 Challenge appraisal

A linear growth model was identified as best fitting for challenge appraisal as it had a similar BIC value (354.548) to the next best fitting model (intercept-only; 353.516), but had a lower AIC value (see Table 5.2). The results indicated a

significant positive rate of change in challenge appraisal ($0.277, p = .040$) as the match approached over the week. The slope variance was $0.323 (p = .160)$ suggesting that there were no between-person differences in this rate of change. The intercept variance was found to be statistically significant ($0.484, p = .005$) suggesting that pre-match challenge appraisal levels varied between participants. The correlation between the intercept and slope was positive and nonsignificant ($r = 0.259, p = .339$), meaning that the two growth factors were unrelated. A significant positive relationship was found between participants' pre-match challenge appraisal and the level of functioning reported in the game ($0.582, p = .018$, see Table 5.3). This relationship suggests that participants who perceived their sporting encounter as an opportunity for growth or gain were more likely to experience greater functioning in their fixture. A negative, nonsignificant relationship was found between the rate of change in challenge appraisal and functioning, suggesting that changes in challenge appraisal in the week before the game were unrelated to in-game functioning.

5.4.3 Salivary Cortisol and DHEA

The salivary cortisol and DHEA analyses were conducted with a subgroup of the sample. Specifically, the analyses presented below focuses on participants ($n = 23$) whose match was played in the early afternoon⁵. Two of the 23 participants did not provide saliva samples and were therefore excluded from the analysis. Furthermore, two participants did not provide a + 3 hour saliva sample and their missing data was imputed as the average concentration from their two adjacent time points. The concentrations of salivary cortisol are displayed in Figure 5.1 and the descriptive statistics for cortisol exposure and the concentrations of cortisol and DHEA in the pre-game sample are presented in Table 5.1. Results from a repeated measures ANOVA show that the cortisol concentrations were significantly different over time, $F(2.26, 45.19) = 5.571, p = .005$. Pairwise comparisons revealed that the concentration of cortisol was significantly greater at + 0.5 hours compared to waking ($p = .002$) and + 3 hours ($p = .004$) samples, but was not significantly different from the + 5.25 hours sample ($p = .057$). No other significant differences were found between samples ($ps > .05$). Bivariate correlations (data not shown) revealed small negative non-significant correlations between cortisol exposure and functioning ($r =$

⁵ The remaining participants' match took place in the evening, which would have meant that their residual cortisol and DHEA levels would have been lower than the other participants due to the diurnal rhythm of cortisol and DHEA secretion (see, Hucklebridge et al., 2005).

Table 5.1 *Descriptive Statistics for Psychological Process Variables, Biomarkers Variables, and Functioning Indicators*

Variable	6 days		5 days		4 days		3 days		2 days		1 day		Pre-game		Post-game	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Process Variables																
Needs satisfaction (1-7)	6.32	0.64	6.22	0.79	6.01	0.79	6.14	0.76	6.22	0.53	6.19	0.70	6.27	0.63		
Challenge appraisal (1-7)	6.10	0.75	6.19	0.77	6.08	0.94	6.18	0.92	6.33	0.67	6.29	0.77	6.31	0.74		
Biomarker Variables																
Pre-game cortisol (+5.25 sample)													0.30	0.17		
Pre-game DHEA (+5.25 sample)													0.02	0.01		
Cortisol exposure													99.11	37.30		
Functioning Indicators																
Subjective performance (0 – 10)															5.70	1.95
Subjective vitality (1-6)															4.86	0.76
Positive affect (1-5)															4.13	0.53

Note. Biomarker variables measured in µg/dL.

Table 5.2 *Latent Growth Model Fit Statistics*

Model	Fit Indices					SRMR
	AIC	BIC	CFI	TLI	RMSEA [90% CI]	
Needs Satisfaction						
Intercept-only	237.779	253.837	.941	.952	.130 [.063, .192]	.371
Linear ^a	239.727	257.569	.937	.947	.138 [.072, .200]	.373
Quadratic	236.082	264.629	.960	.956	.126 [.039, .198]	.385
Cubic ^a	234.126	264.457	.971	.966	.109 [.000, .187]	.311
Challenge Appraisal						
Intercept-only	337.459	353.516	.964	.971	.090 [.000, .159]	.237
Linear	333.138	354.548	.987	.988	.057 [.000, .141]	.215
Quadratic	331.560	360.107	1.000	1.010	.000 [.000, .114]	.128
Cubic ^b	333.452	363.783	1.000	1.009	.000 [.000, .119]	.124

Note. AIC = Akaike's information criterion; BIC = Bayesian information criterion; CFI = comparative fit index; TLI = Tucker-Lewis index; RMSEA = root mean square error of approximation; CI = confidence interval; SRMR = standardized root mean square residual.

^aVariance of the slope growth factor fixed at zero. ^bVariance of the cubic growth factor fixed at zero.

Table 5.3 *Results from the Latent Growth Models with a Functioning Distal Outcome*

Model	Parameter	Unstandardized Factor Loadings			Fit Indices					
		Estimate	SE	P value	AIC	BIC	CFI	TLI	RMSEA [90% CI]	SRMR
Needs Satisfaction: Intercept					380.18	401.591	.938	.946	.120 [.056, .177]	.328
	Funct ON i	0.729	0.344	0.034						
Challenge Appraisal: Linear					478.532	507.079	.983	.983	.064 [.000, .138]	.210
	Funct ON i	0.582	0.245	0.018						
	Funct ON s	-0.323	0.446	0.469						

Note. AIC = Akaike's information criterion; BIC = Bayesian information criterion; CFI = comparative fit index; TLI = Tucker-Lewis index; RMSEA = root mean square error of approximation; CI = confidence interval; SRMR = standardized root mean square residual; Funct = functioning; i = intercept growth factor; s = slope growth factor

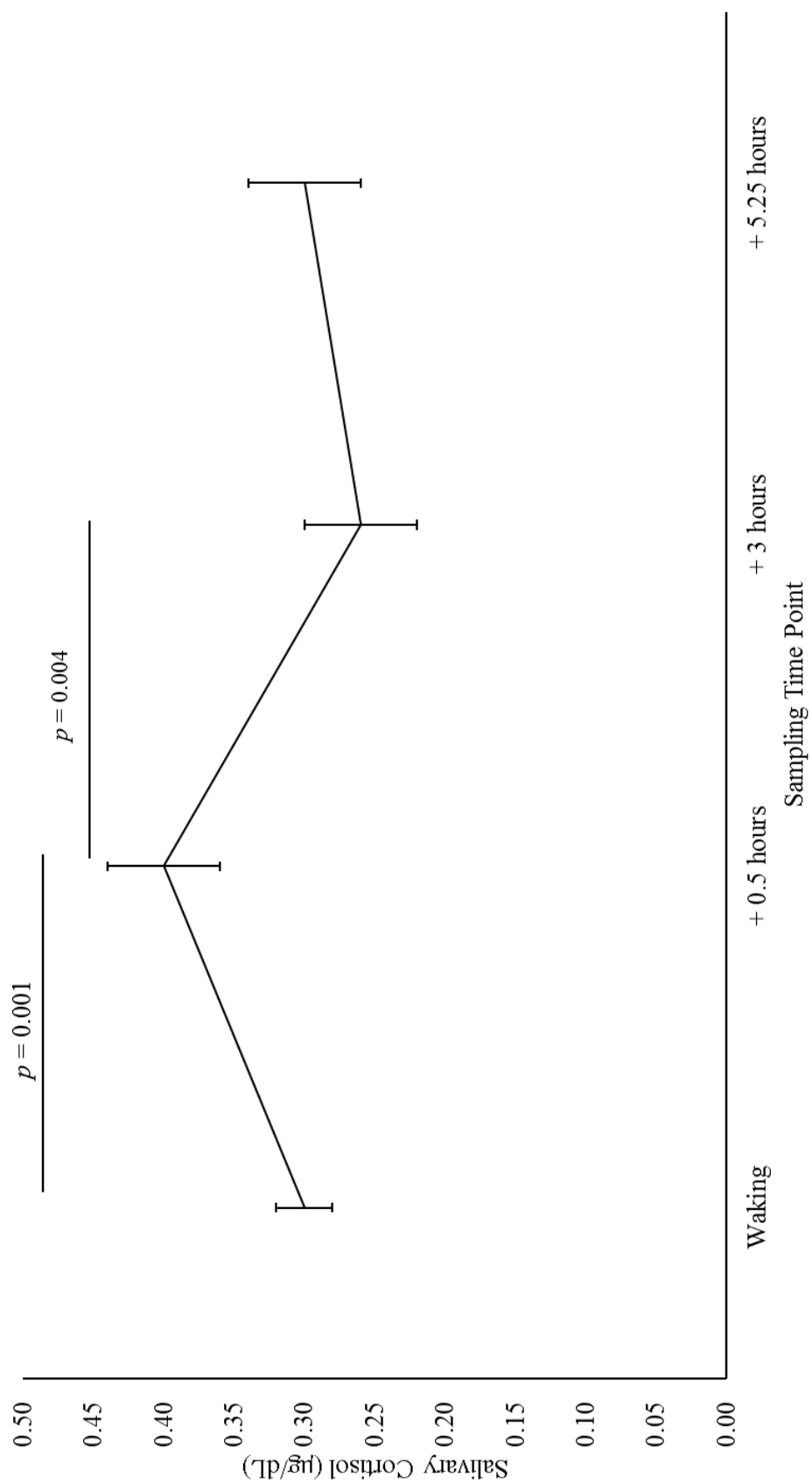


Figure 5.1 Mean concentration of salivary cortisol recorded in each of the four samples.

Error bars = standard error of mean.

-.288, $p = .205$) and between pre-game cortisol concentration (+5.25 hours sample) and functioning ($r = -.112$, $p = .629$). Furthermore, small positive nonsignificant correlations were observed between DHEA and functioning ($r = .275$, $p = .255$) and between the ratio of DHEA:cortisol and functioning ($r = .109$, $p = .658$). Given the lack of statistically significant relationships between the salivary variables and functioning, no regression analyses were conducted.

5.5 Discussion

Being able to predict how sport performers are going to respond to the demands they experience has important implications for research and practice. To date, knowledge has accumulated on the responses displayed and why some may be more beneficial than others (e.g., why anxiety arising when experiencing a competitive stressor may be either facilitative or debilitative). However, surprisingly little research has been conducted on predicting the most adaptive of these responses – thriving. To advance understanding in this area, the purpose of the present study was to examine whether it was possible to predict in-match thriving in sport performers using pertinent variables (viz. BPNS, challenge appraisal) previously forwarded to facilitate thriving in other populations (see, e.g., O'Leary & Ickovics, 1995; Spreitzer & Porath, 2014). In addition, this study attempted to overcome the limitations of previous research that has been based solely on self-report data, by exploring whether biomarkers existed for thriving (see, Epel et al., 1998).

Turning first to the prediction of thriving, conditional latent growth models were constructed to examine the effects of pre-match BPNS and challenge appraisal on in-match thriving. BPNS represents the extent that an individual experiences feelings of autonomy, competence, and relatedness (Deci & Ryan, 2000), with higher levels on these three needs believed to facilitate positive outcomes (e.g., psychological well-being) and, ultimately, human thriving (Deci & Vansteenkiste, 2004; Ryan & Deci, 2000; Sheldon, 2009). The findings of the current study supported this assertion, with pre-game levels of BPNS found to positively predict functioning in athletes. These results can be explained by the energizing and adaptive effects of experiencing BPNS (cf. Deci & Ryan, 2000). To elaborate, satisfaction of the three basic psychological needs has been shown to elicit intrinsic motivation, which, in turn, drives individuals' active engagement with tasks and affords a greater propensity for growth through the successful completion of these

activities (Deci & Ryan, 2000; Ryan & Deci, 2000). In the context of the sport performers in the present study, the players who perceived higher levels of BPNS prior to the match may have experienced higher quality motivation (i.e., intrinsic) for the encounter and, subsequently, elevated levels of in-match task engagement which resulted in higher levels of performance and well-being. In contrast, participants who perceived lower levels of pre-match BPNS would have demonstrated less engagement and lower levels of functioning. Although a predictive relationship between BPNS and well-being has previously been observed in sport performers (see, e.g., Gagné, Ryan, & Bargmann, 2003; Reinboth & Duda, 2006), and a relationship between BPNS and thriving has been explicated in the work literature (see, Spreitzer & Porath, 2014), identifying a significant predictive relationship of BPNS and thriving in sport provides a novel addition to the literature. Furthermore, this finding illuminates a modifiable process through which thriving can be facilitated in sport performers.

In the second conditional latent growth model examining the relationship between challenge appraisal and functioning, challenge appraisals were found to increase in a linear fashion as the game approached, with pre-game levels of challenge appraisal positively predicting in-game functioning. This finding differs to previous exploratory, cross-sectional analysis which found the level of challenge appraisal to be a non-significant predictor for the likelihood of membership to a thriving profile (Brown, Arnold, et al., 2017b; see Chapter 3), and instead provides the first empirical evidence of a relationship between these two variables (cf. Carver, 1998; O'Leary & Ickovics, 1995). To explain this relationship, challenge appraisals have previously been found to directly elicit facilitative outcomes in sport performers (see, e.g., Fletcher & Sarkar, 2012; Freeman & Rees, 2009), and to indirectly impact performance and well-being through task engagement and effective coping (see, e.g., Doron & Martinent, 2016a; Tomaka, Blascovich, Kelsey, & Leitten, 1993). Thus, within the present study, sport performers who appraised the encounter more greatly as a challenge, may have approached and engaged with the demands of the task in a facilitative manner, effectively overcame the demands, and, ultimately, thrived. Whereas those whose reported lower levels of challenge appraisal may have been more hesitant in their responses to the demands and have only managed or succumbed to them.

Previous research has suggested that thriving may be represented

physiologically through an individual's hormonal response to a demanding situation (Epel et al., 1998). Specifically, identified potential biomarkers of thriving include salivary cortisol reactivity and anabolic balance (e.g., by measuring the ratio of the catabolic hormone cortisol to anabolic hormones such as DHEA; Epel et al., 1998; Mendes et al., 2007). Within the present study, secretion of cortisol on match day followed the diurnal rhythm previously described in the literature (see Figure 5.1; Hucklebridge et al., 2005). Additionally, the results suggested that participants experienced a slight increase in cortisol concentration when arriving at the venue prior to the match, which is consistent with the anticipatory rise in cortisol levels previously identified prior to sporting encounters (see, e.g., Filaire, Alix, Ferrand, & Verger, 2009; Kivlighan, Granger, & Booth, 2005; Suay et al., 1999). In contrast to the supposition that cortisol reactivity is related to thriving (Epel et al., 1998), the results found no statistically significant relationship between cortisol and functioning when considered in terms of either the total exposure to cortisol on the morning of the match or the pre-match concentration. Although it is possible that these non-significant results occurred due to the reduced number of participants included in the analysis, it is also possible that this contrary finding was due to the different settings in which the studies were conducted. To elaborate, Epel and colleagues (Epel et al., 1998; Mendes et al., 2007) examined biomarkers of thriving in a laboratory setting with participants exposed to an artificial stressor; in contrast, the present study was conducted in a naturalistic setting with participants' responses assessed in relation to a real-life sporting encounter. Although the laboratory environment can afford researchers high internal reliability and greater control to elucidate potential physiological changes (see, for a discussion, Reis, 2012), the results of the current study suggest that these findings do not translate to an applied context. In a similar vein, scholars examining relationships between cortisol concentration and other sporting outcomes (e.g., performance) have also found uncertainty and inconsistency (see, e.g., Lautenbach, Laborde, Klämpfl, & Achtzehn, 2015; Robazza et al., 2012). Therefore, in combination, these findings highlight that much more needs to be done to understand the mechanisms through which cortisol is related to performance and well-being in ecologically valid settings.

The analysis conducted on the relationship between the ratio of DHEA:cortisol (i.e., the anabolic balance) and functioning also returned a non-significant association with thriving. This finding is in contrast to previous

conceptual suggestions linking anabolic balance to thriving (Epel et al., 1998), and with research identifying relationships between the ratio of DHEA and cortisol with performance (e.g., Morgan et al., 2004) and indicators of well-being (e.g., anxiety, mood; van Niekerk, Huppert, & Herbert, 2001). Although Morgan et al. (2004) and van Niekerk et al. (2001) found a positive relationship between the ratio of DHEA:cortisol and desirable outcomes, noteworthy methodological differences exist between these studies and the one reported herein. To elaborate, Morgan et al. (2004) examined concentrations of salivary cortisol and plasma (i.e., the liquid component of blood) levels of the sulphated form of DHEA (DHEA-S). In addition, hormone responses were assessed after participants' exposure to an acute stressor, rather than in advance of it. Given DHEA-S is considered to be less reactive to acute psychosocial stress than DHEA (see, e.g., Izawa et al., 2008), the significant difference between DHEA-S concentrations noted by Morgan et al. (2004), suggests that the timing of assessment (i.e., before or after exposure) had a substantial bearing on the relationships identified. The timing of assessment may also explain the difference between the results found in the present study and those reported by van Niekerk et al. (2001). More specifically, van Niekerk et al. (2001) computed the ratio between salivary cortisol:DHEA from samples collected at 08:00, whereas the current study examined the inverse relationship (DHEA:cortisol; Townsend, Eliezer, Major, & Mendes, 2014) in samples collected + 5.25 hours after waking. The ratios computed by van Niekerk et al. (2001) would have been influenced by the diurnal changes in cortisol, with cortisol:DHEA ratios greatest for participants who had awoken within 30 minutes of providing the sample. Thus, by collecting samples early in the morning, the findings of Niekerk et al (2001) would have been biased toward variations in only one of the two hormones included in the ratio (cf. Heaney et al., 2014). An alternative explanation for the lack of relationship between DHEA:cortisol and functioning, is that the notion of an anabolic balance and its suggested relationship with thriving may be too simplistic to reflect the psychophysiological responses to naturalistic stressors. For example, although an individual may demonstrate a physiological stress response when faced with a demand, it is often the interpretation of this response, rather than the presence the response itself, that dictates how an individual copes (cf. Alpert & Haber, 1960; Jones, Hanton, & Swain, 1994; Ntoumanis & Biddle, 2000), and whether they, ultimately, go onto thrive.

The present study has a number of noteworthy strengths that underpin its contribution to the literature. First, the use of a prospective study design to predict thriving made it possible to disentangle participants' in-match experiences from their pre-match perceptions, thus ensuring that evaluations of BPNS and challenge appraisal were not impacted by match outcome, performance, or well-being (cf. Brown, Arnold, et al., 2017a; see Chapter 4). Second, data were collected using multiple methods (i.e., self-report questionnaire, saliva samples) to overcome the limitations pertinent to the sole use of questionnaires in the extant thriving literature in sport (e.g., common method bias; Podsakoff et al., 2012). Third, the study was conducted in an applied sports setting, which afforded greater external validity and provided a more ecologically appropriate setting within which to examine the suggested biomarkers of thriving. Despite these strengths, it is important to recognize where the study's findings may be limited. For example, the timing of one of the fixtures meant that it was only possible to conduct comparable analysis of salivary variables on a subset of the participants. Although this was out of the researchers' control, it meant that, when examining the correlations between the salivary hormones and functioning, it was only possible to identify small but statistically non-significant associations. These findings, therefore, require further verification in future research with larger samples. An additional consideration for future analysis is the use of mean-level analysis versus within-person analysis of cortisol. Previous literature has demonstrated that mean levels of salivary hormone concentrations are sensitive to perceived stress and exercise (see, e.g., Heaney et al., 2014); however, these differences were not apparent within the present analysis. An alternative, more refined approach that could be used to examine differences in cortisol concentrations in future research, would be to examine the differences in change of concentrations between a baseline day and match day for thriving and non-thriving performers (see, e.g., Meggs, Golby, Mallett, Gucciardi, & Polman, 2015). When considering the self-report variables, the present study only considered potential process variables of thriving with functioning. To advance the literature, it would be beneficial for future research to examine the relationships between these process variables and enabler variables of thriving (e.g., resilient qualities, psychological skills use; Brown, Arnold, et al., 2017b; see Chapter 3). Examining the interactions between these variables and thriving, would establish a comprehensive understanding of the mechanisms underpinning the construct and

support the development of interventions to facilitate it in sport performers.

Notwithstanding these limitations, the findings of this study provide implications for applied practice and the facilitation of thriving. For example, one of the ways to promote thriving through these process variables may be to enable sport performers to perceive the sporting demands encountered as an optimal challenge. To elaborate, perceiving a scenario as optimally discrepant from one's competencies (i.e., not too easy and not too difficult), would evoke a stressful appraisal and signal an opportunity for mastery or gain (Lazarus & Folkman, 1984). Strategies to elicit this perception may include teaching individuals to reappraise a threatening scenario as a challenge (see, e.g., Moore, Vine, Wilson, & Freeman, 2015), or working with performers to increase their awareness and presence of resources that they could use to overcome the demands experienced (e.g., personal resilient qualities; Reivich, Seligman, & McBride, 2011). A second approach that could be taken to promote thriving would involve the creation of a needs supportive environment (cf. Deci & Ryan, 2000; Reinboth, Duda, & Ntoumanis, 2004). For example, coaches could provide athletes with choice within specific rules and limits, and offer a rationale for tasks being completed, to support athletes' perceptions of autonomy (i.e., the determinant of one's own behaviour; see, for a review, Mageau & Vallerand, 2003), which would, in turn, facilitate athlete thriving. Furthermore, other types of autonomy-supportive behaviours such as acknowledging the other person's feelings and perspectives, and avoiding criticisms could be used to foster perceptions of relatedness and competence (Bartholomew, Ntoumanis, & Thøgersen-Ntoumani, 2009; Mageau & Vallerand, 2003). When designing these interventions, particular consideration should be given to their delivery during high-stakes competitions as it is during these events that coaches may revert to maladaptive, controlling motivation styles (Cheon, Reeve, Lee, & Lee, 2015; Mahoney, Ntoumanis, Gucciardi, Mallett, & Stebbings, 2016).

In conclusion, levels of BPNS and challenge appraisal reported before a sporting fixture were found to positively predict in-game functioning (i.e., performance and well-being). This finding provides the first evidence supporting these predictors of thriving in the sports domain and offers a potential avenue through which practitioners can look to facilitate thriving in performers. Furthermore, the findings from this study highlighted a number of considerations for the physiological measurement of thriving.

5.6 Reference List

- ActiGraph. (2013). ActiLife 6: Data analysis software (Version 6.6.3). Pensacola, FL: ActiGraph, LLC.
- Akaike, H. (1987). Factor analysis and AIC. *Psychometrika*, 52, 317-332.
doi:10.1007/Bf02294359
- Alpert, R., & Haber, R. N. (1960). Anxiety in academic achievement situations. *The Journal of Abnormal and Social Psychology*, 61, 207-215.
doi:10.1037/h0045464
- Arbuckle, J. L. (2007). *Amos 16 user's guide*. Chicago, IL: SPSS.
- Arnold, R., & Fletcher, D. (2012). A research synthesis and taxonomic classification of the organizational stressors encountered by sport performers. *Journal of Sport & Exercise Psychology*, 34, 397-429.
- Austin, P. C., & Steyerberg, E. W. (2015). The number of subjects per variable required in linear regression analyses. *Journal of Clinical Epidemiology*, 68, 627-636. doi:10.1016/j.jclinepi.2014.12.014
- Barreira, T. V., Schuna, J. M., Jr., Mire, E. F., Katzmarzyk, P. T., Chaput, J. P., Leduc, G., & Tudor-Locke, C. (2015). Identifying children's nocturnal sleep using 24-h waist accelerometry. *Medicine and Science in Sports and Exercise*, 47, 937-943. doi:10.1249/MSS.0000000000000486
- Bartholomew, K. J., Ntoumanis, N., & Thøgersen-Ntoumani, C. (2009). A review of controlling motivational strategies from a self-determination theory perspective: Implications for sports coaches. *International Review of Sport and Exercise Psychology*, 2, 215-233. doi:10.1080/17509840903235330
- Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin*, 107, 238-246. doi:10.1037/0033-2909.107.2.238
- Bentler, P. M. (1995). *EQS for Windows user's guide*. Encino, CA: Multivariate Software.
- Boat, R., & Taylor, I. M. (2015). Patterns of change in psychological variables leading up to competition in superior versus inferior performers. *Journal of Sport & Exercise Psychology*, 37, 244-256. doi:10.1123/jsep.2014-0216
- Brown, D. J., Arnold, R., Fletcher, D., & Standage, M. (in press). Human thriving: A conceptual debate and literature review. *European Psychologist*.
- Brown, D. J., Arnold, R., Reid, T., & Roberts, G. (2017). *A qualitative inquiry of thriving in elite sport*. Manuscript submitted for publication.

- Brown, D. J., Arnold, R., Standage, M., & Fletcher, D. (2017a). *One-off or serial thrivers? A latent class growth analysis of sport performers' responses to competitive sporting encounters over time*. Manuscript in preparation.
- Brown, D. J., Arnold, R., Standage, M., & Fletcher, D. (2017b). *Thriving on pressure: A factor mixture analysis of sport performers' responses to competitive sporting encounters*. Manuscript submitted for publication.
- Buford, T. W., & Willoughby, D. S. (2008). Impact of DHEA(S) and cortisol on immune function in aging: A brief review. *Applied Physiology, Nutrition, and Metabolism*, 33, 429-433. doi:10.1139/H08-013
- Carrasco, G. A., & Van de Kar, L. D. (2003). Neuroendocrine pharmacology of stress. *European Journal of Pharmacology*, 463, 235-272. doi:10.1016/S0014-2999(03)01285-8
- Carver, C. S. (1998). Resilience and thriving: Issues, models, and linkages. *Journal of Social Issues*, 54, 245-266. doi:10.1111/0022-4537.641998064
- Cheon, S. H., Reeve, J., Lee, J., & Lee, Y. (2015). Giving and receiving autonomy support in a high-stakes sport context: A field-based experiment during the 2012 London Paralympic Games. *Psychology of Sport and Exercise*, 19, 59-69. doi:10.1016/j.psychsport.2015.02.007
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.
- Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11, 227-268. doi:10.1207/S15327965PLI1104_01
- Deci, E. L., & Vansteenkiste, M. (2004). Self-determination theory and basic need satisfaction: Understanding human development in positive psychology. *Ricerche di Psicologia*, 27, 17-34.
- Dickerson, S. S., & Kemeny, M. E. (2004). Acute stressors and cortisol responses: A theoretical integration and synthesis of laboratory research. *Psychological Bulletin*, 130, 355-391. doi:10.1037/0033-2909.130.3.355
- Doron, J., & Martinent, G. (2016a). Appraisal, coping, emotion, and performance during elite fencing matches: A random coefficient regression model approach. *Scandinavian Journal of Medicine & Science in Sports*. Advance online publication. doi:10.1111/sms.12711
- Doron, J., & Martinent, G. (2016b). Trajectories of psychological states of women

- elite fencers during the final stages of international matches. *Journal of Sports Sciences*, 34, 836-842. doi:10.1080/02640414.2015.1075056
- Drasgow, F., & Hulin, C. (1990). Item response theory. In M. D. Dunnette & L. M. Hough (Eds.), *Handbook of industrial & organizational psychology* (2nd ed., pp. 577-636). Palo Alto, CA: Consulting Psychologists Press.
- Duan, H., Yuan, Y., Zhang, L., Qin, S., Zhang, K., Buchanan, T. W., & Wu, J. (2013). Chronic stress exposure decreases the cortisol awakening response in healthy young men. *Stress*, 16, 630-637. doi:10.3109/10253890.2013.840579
- Edwards, J. R. (2008). To prosper, organizational psychology should ... overcome methodological barriers to progress. *Journal of Organizational Behavior*, 29, 469-491. doi:10.1002/job.529
- Epel, E. S., McEwen, B. S., & Ickovics, J. R. (1998). Embodying psychological thriving: Physical thriving in response to stress. *Journal of Social Issues*, 54, 301-322. doi:10.1111/0022-4537.671998067
- Filaire, E., Alix, D., Ferrand, C., & Verger, M. (2009). Psychophysiological stress in tennis players during the first single match of a tournament. *Psychoneuroendocrinology*, 34, 150-157. doi:10.1016/j.psyneuen.2008.08.022
- Fletcher, D., & Sarkar, M. (2012). A grounded theory of psychological resilience in Olympic champions. *Psychology of Sport and Exercise*, 13, 669-678. doi:10.1016/j.psychsport.2012.04.007
- Freeman, P., & Rees, T. (2009). How does perceived support lead to better performance? An examination of potential mechanisms. *Journal of Applied Sport Psychology*, 21, 429-441. doi:10.1080/10413200903222913
- Gagné, M., Ryan, R. M., & Bargmann, K. (2003). Autonomy support and need satisfaction in the motivation and well-being of gymnasts. *Journal of Applied Sport Psychology*, 15, 372-390. doi:10.1080/714044203
- Gaudreau, P., Nicholls, A., & Levy, A. R. (2010). The ups and downs of coping and sport achievement: An episodic process analysis of within-person associations. *Journal of Sport & Exercise Psychology*, 32, 298-311.
- Ghiciuc, C. M., Cozma-Dima, C. L., Pasquali, V., Renzi, P., Simeoni, S., Lupusoru, C. E., & Patacchioli, F. R. (2011). Awakening responses and diurnal fluctuations of salivary cortisol, DHEA-S and alpha-amylase in healthy male subjects. *Neuroendocrinology Letters*, 32, 475-480.

- Gucciardi, D. F., Jackson, B., Hodge, K., Anthony, D. R., & Brooke, L. E. (2015). Implicit theories of mental toughness: Relations with cognitive, motivational, and behavioral correlates. *Sport, Exercise, and Performance Psychology*, 4, 100-112. doi:10.1037/spy0000024
- Harvey, R. J., & Hammer, A. L. (1999). Item response theory. *The Counseling Psychologist*, 27, 353-383. doi:10.1177/0011000099273004
- Heaney, J. L., Carroll, D., & Phillips, A. C. (2014). Physical activity, life events stress, cortisol, and DHEA: Preliminary findings that physical activity may buffer against the negative effects of stress. *Journal of Aging and Physical Activity*, 22, 465-473. doi:10.1123/japa.2012-0082
- Hill, E. E., Zack, E., Battaglini, C., Viru, M., Viru, A., & Hackney, A. C. (2008). Exercise and circulating cortisol levels: The intensity threshold effect. *Journal of Endocrinological Investigation*, 31, 587-591. doi:10.1007/bf03345606
- Hu, L.-T., & Bentler, P. M. (1995). Evaluating model fit. In R. H. Hoyle (Ed.), *Structural equation modeling: Concepts, issues, and applications* (pp. 76-99). Thousand Oaks, CA: Sage.
- Hucklebridge, F., Hussain, T., Evans, P., & Clow, A. (2005). The diurnal patterns of the adrenal steroids cortisol and dehydroepiandrosterone (DHEA) in relation to awakening. *Psychoneuroendocrinology*, 30, 51-57. doi:10.1016/j.psyneuen.2004.04.007
- IBM. (2013). IBM SPSS Statistics (Version 22.0.0.1). Meadville, PA: IBM.
- Izawa, S., Sugaya, N., Shiotsuki, K., Yamada, K. C., Ogawa, N., Ouchi, Y., . . . Nomura, S. (2008). Salivary dehydroepiandrosterone secretion in response to acute psychosocial stress and its correlations with biological and psychological changes. *Biological Psychology*, 79, 294-298. doi:10.1016/j.biopsycho.2008.07.003
- Jones, G. (1995). More than just a game: Research developments and issues in competitive anxiety in sport. *British Journal of Psychology*, 86, 449-478. doi:10.1111/j.2044-8295.1995.tb02565.x
- Jones, G., Hanton, S., & Swain, A. (1994). Intensity and interpretation of anxiety symptoms in elite and non-elite sports performers. *Personality and Individual Differences*, 17, 657-663. doi:10.1016/0191-8869(94)90138-4
- Kahneman, D., Diener, E., & Schwarz, N. (Eds.). (1999). *Well-being: Foundations*

of hedonic psychology. New York, NY: Russell Sage Foundation.

- Kass, R. E., & Raftery, A. E. (1995). Bayes factors. *Journal of the American Statistical Association*, 90, 773-795. doi:10.1080/01621459.1995.10476572
- Kivlighan, K. T., Granger, D. A., & Booth, A. (2005). Gender differences in testosterone and cortisol response to competition. *Psychoneuroendocrinology*, 30, 58-71. doi:10.1016/j.psyneuen.2004.05.009
- Kivlighan, K. T., Granger, D. A., Schwartz, E. B., Nelson, V., Curran, M., & Shirtcliff, E. A. (2004). Quantifying blood leakage into the oral mucosa and its effects on the measurement of cortisol, dehydroepiandrosterone, and testosterone in saliva. *Hormones and Behavior*, 46, 39-46. doi:10.1016/j.yhbeh.2004.01.006
- Kumari, M., Badrick, E., Ferrie, J., Perski, A., Marmot, M., & Chandola, T. (2009). Self-reported sleep duration and sleep disturbance are independently associated with cortisol secretion in the Whitehall II study. *The Journal of Clinical Endocrinology & Metabolism*, 94, 4801-4809. doi:10.1210/jc.2009-0555
- Lautenbach, F., Laborde, S., Klämpfl, M., & Achtzehn, S. (2015). A link between cortisol and performance: An exploratory case study of a tennis match. *International Journal of Psychophysiology*, 98, 167-173. doi:10.1016/j.ijpsycho.2015.10.002
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York, NY: Springer.
- Mageau, G. A., & Vallerand, R. J. (2003). The coach-athlete relationship: A motivational model. *Journal of Sports Sciences*, 21, 883-904. doi:10.1080/0264041031000140374
- Mahoney, J. W., Ntoumanis, N., Gucciardi, D. F., Mallett, C. J., & Stebbings, J. (2016). Implementing an autonomy-supportive intervention to develop mental toughness in adolescent rowers. *Journal of Applied Sport Psychology*, 28, 199-215. doi:10.1080/10413200.2015.1101030
- Maninger, N., Wolkowitz, O. M., Reus, V. I., Epel, E. S., & Mellon, S. H. (2009). Neurobiological and neuropsychiatric effects of dehydroepiandrosterone (DHEA) and DHEA sulfate (DHEAS). *Frontiers in Neuroendocrinology*, 30, 65-91. doi:10.1016/j.yfrne.2008.11.002
- McEwen, B. S. (2003). Interacting mediators of allostasis and allostatic load:

- Towards an understanding of resilience in aging. *Metabolism*, 52, 10-16.
doi:10.1016/S0026-0495(03)00295-6
- McGregor, H. A., & Elliot, A. J. (2002). Achievement goals as predictors of achievement-relevant processes prior to task engagement. *Journal of Educational Psychology*, 94, 381-395. doi:10.1037/0022-0663.94.2.381
- Meggs, J., Golby, J., Mallet, C. J., Gucciardi, D. F., & Polman, R. C. J. (2015). The cortisol awakening response and resilience in elite swimmers. *International Journal of Sports Medicine*, 37, 169-174. doi:10.1055/s-0035-1559773
- Mendes, W. B., Gray, H. M., Mendoza-Denton, R., Major, B., & Epel, E. S. (2007). Why egalitarianism might be good for your health: Physiological thriving during stressful intergroup encounters. *Psychological Science*, 18, 991-998. doi:10.1111/j.1467-9280.2007.02014.x
- Moore, L. J., Vine, S. J., Wilson, M. R., & Freeman, P. (2015). Reappraising threat: How to optimize performance under pressure. *Journal of Sport & Exercise Psychology*, 37, 339-343. doi:10.1123/jsep.2014-0186
- Morgan, C. A., III., Southwick, S., Hazlett, G., Rasmusson, A., Hoyt, G., Zimolo, Z., & Charney, D. (2004). Relationships among plasma dehydroepiandrosterone sulfate and cortisol levels, symptoms of dissociation, and objective performance in humans exposed to acute stress. *Archives of General Psychiatry*, 61, 819-825. doi:10.1001/archpsyc.61.8.819
- Muthén, B. O., & Curran, P. J. (1997). General longitudinal modeling of individual differences in experimental designs: A latent variable framework for analysis and power estimation. *Psychological Methods*, 2, 371-402. doi:10.1037/1082-989X.2.4.371
- Muthén, L. K., & Muthén, B. O. (2015). Mplus (Version 7.4). Los Angeles, CA: StatModel.
- Navazesh, M. (1993). Methods for collecting saliva. *Annals of the New York Academy of Sciences*, 694, 72-77. doi:10.1111/j.1749-6632.1993.tb18343.x
- Ng, J. Y. Y., Lonsdale, C., & Hodge, K. (2011). The Basic Needs Satisfaction in Sport Scale (BNSSS): Instrument development and initial validity evidence. *Psychology of Sport and Exercise*, 12, 257-264. doi:10.1016/j.psychsport.2010.10.006
- Ntoumanis, N., & Biddle, S. J. H. (2000). Relationship of intensity and direction of competitive anxiety with coping strategies. *The Sport Psychologist*, 14, 360-

371. doi:10.1123/tsp.14.4.360

- O'Leary, V. E., & Ickovics, J. R. (1995). Resilience and thriving in response to challenge: An opportunity for a paradigm shift in women's health. *Women's Health, 1*, 121-142.
- Pensgaard, A. M., & Duda, J. L. (2003). Sydney 2000: The interplay between emotions, coping, and the performance of Olympic-level athletes. *The Sport Psychologist, 17*, 253-267.
- Piazza, J. R., Almeida, D. M., Dmitrieva, N. O., & Klein, L. C. (2010). Frontiers in the use of biomarkers of health in research on stress and aging. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 65B*, 513-525. doi:10.1093/geronb/gbq049
- Podsakoff, P. M., MacKenzie, S. B., & Podsakoff, N. P. (2012). Sources of method bias in social science research and recommendations on how to control it. *Annual Review of Psychology, 63*, 539-569. doi:10.1146/annurev-psych-120710-100452
- Preacher, K. J. (2010). Latent growth curve models. In G. R. Hancock & R. O. Mueller (Eds.), *The reviewer's guide to quantitative methods in the social sciences* (pp. 199-208). New York, NY: Routledge.
- Preacher, K. J., Wichman, A. L., MacCallum, R. C., & Briggs, N. E. (2008). *Latent growth curve modeling*. Thousand Oaks, CA: Sage.
- Pruessner, J. C., Kirschbaum, C., Meinlschmid, G., & Hellhammer, D. H. (2003). Two formulas for computation of the area under the curve represent measures of total hormone concentration versus time-dependent change. *Psychoneuroendocrinology, 28*, 916-931. doi:10.1016/S0306-4530(02)00108-7
- Reinboth, M., & Duda, J. L. (2006). Perceived motivational climate, need satisfaction and indices of well-being in team sports: A longitudinal perspective. *Psychology of Sport and Exercise, 7*, 269-286. doi:10.1016/j.psychsport.2005.06.002
- Reinboth, M., Duda, J. L., & Ntoumanis, N. (2004). Dimensions of coaching behavior, need satisfaction, and the psychological and physical welfare of young athletes. *Motivation and Emotion, 28*, 297-313. doi:10.1023/B:MOEM.0000040156.81924.b8
- Reis, H. T. (2012). Why researchers should think "real-world". In M. Mehl & T. S.

- Conner (Eds.), *Handbook of research methods for studying daily life* (pp. 3-21). New York, NY: Guilford Press.
- Reisch, N., Slawik, M., Zwermann, O., Beuschlein, F., & Reincke, M. (2005). Genetic influence of an ACTH receptor promoter polymorphism on adrenal androgen secretion. *European Journal of Endocrinology*, *153*, 711-715. doi:10.1530/eje.1.02015
- Reivich, K. J., Seligman, M. E. P., & McBride, S. (2011). Master resilience training in the U.S. Army. *American Psychologist*, *66*, 25-34. doi:10.1037/a0021897
- Robazza, C., Gallina, S., D'Amico, M. A., Izzicupo, P., Bascelli, A., Di Fonso, A., . . . Di Baldassarre, A. (2012). Relationship between biological markers and psychological states in elite basketball players across a competitive season. *Psychology of Sport and Exercise*, *13*, 509-517. doi:10.1016/j.psychsport.2012.02.011
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, *55*, 68-78. doi:10.1037/0003-066X.55.1.68
- Ryan, R. M., & Frederick, C. (1997). On energy, personality, and health: Subjective vitality as a dynamic reflection of well-being. *Journal of Personality*, *65*, 529-565. doi:10.1111/j.1467-6494.1997.tb00326.x
- Ryan, R. M., Huta, V., & Deci, E. L. (2008). Living well: A self-determination theory perspective on eudaimonia. *Journal of Happiness Studies*, *9*, 139-170. doi:10.1007/s10902-006-9023-4
- Sadeh, A., Sharkey, K. M., & Carskadon, M. A. (1994). Activity-based sleep-wake identification: An empirical test of methodological issues. *Sleep*, *17*, 201-207.
- Sapolsky, R. M., Romero, L. M., & Munck, A. U. (2000). How do glucocorticoids influence stress responses? Integrating permissive, suppressive, stimulatory, and preparative actions. *Endocrine Reviews*, *21*, 55-89. doi:10.1210/edrv.21.1.0389
- Sarkar, M., & Fletcher, D. (2014). Psychological resilience in sport performers: A review of stressors and protective factors. *Journal of Sports Sciences*, *32*, 1419-1434. doi:10.1080/02640414.2014.901551
- Sasaki, J. E., John, D., & Freedson, P. S. (2011). Validation and comparison of ActiGraph activity monitors. *Journal of Science and Medicine in Sport*, *14*,

411-416. doi:10.1016/j.jsams.2011.04.003

Schwartz, G. (1978). Estimating the dimension of a model. *The Annals of Statistics*, 6, 461-464. doi:10.1214/aos/1176344136

Sheldon, K. M. (2009). Providing the scientific backbone for positive psychology: A multi-level conception of human thriving. *Psihologijske Teme*, 18, 267-284.

Shier, D., Butler, J., & Lewis, R. (2015). *Hole's essentials of human anatomy & physiology* (12th ed.). New York, NY: McGraw-Hill.

Skinner, N., & Brewer, N. (2004). Adaptive approaches to competition: Challenge appraisals and positive emotion. *Journal of Sport & Exercise Psychology*, 26, 283-305.

Spreitzer, G., & Porath, C. (2014). Self-determination as a nutriment for thriving: Building an integrative model of human growth at work. In M. Gagné (Ed.), *The Oxford handbook of work engagement, motivation, and self-determination theory* (pp. 245-258). New York, NY: Oxford University Press.

Stalder, T., Kirschbaum, C., Kudielka, B. M., Adam, E. K., Pruessner, J. C., Wust, S., . . . Clow, A. (2016). Assessment of the cortisol awakening response: Expert consensus guidelines. *Psychoneuroendocrinology*, 63, 414-432. doi:10.1016/j.psyneuen.2015.10.010

Steiger, J. H., & Lind, J. C. (1980, June). *Statistically based tests for the number of common factors*. Paper presented at the Psychometric Society annual meeting, Iowa City, IA.

Suay, F., Salvador, A., González-Bono, E., Sanchís, C., Martínez, M., Martínez-Sanchis, S., . . . Montoro, J. B. (1999). Effects of competition and its outcome on serum testosterone, cortisol and prolactin. *Psychoneuroendocrinology*, 24, 551-566. doi:10.1016/S0306-4530(99)00011-6

Tabachnick, B. G., & Fidell, L. S. (2013). *Using multivariate statistics* (6th ed.). London, UK: Pearson.

Taylor, M. K., Padilla, G. A., Stanfill, K. E., Markham, A. E., Khosravi, J. Y., Ward, M. D., & Koehler, M. M. (2012). Effects of dehydroepiandrosterone supplementation during stressful military training: A randomized, controlled, double-blind field study. *Stress*, 15, 85-96. doi:10.3109/10253890.2011.585189

- Thompson, E. R. (2007). Development and validation of an internationally reliable short-form of the Positive and Negative Affect Schedule (PANAS). *Journal of Cross-Cultural Psychology*, 38, 227-242. doi:10.1177/0022022106297301
- Tomaka, J., Blascovich, J., Kelsey, R. M., & Leitten, C. L. (1993). Subjective, physiological, and behavioral effects of threat and challenge appraisal. *Journal of Personality and Social Psychology*, 65, 248-260. doi:10.1037/0022-3514.65.2.248
- Townsend, S. S. M., Eliezer, D., Major, B., & Mendes, W. B. (2014). Influencing the world versus adjusting to constraints: Social class moderates responses to discrimination. *Social Psychological and Personality Science*, 5, 226-234. doi:10.1177/1948550613490968
- Tucker, L. R., & Lewis, C. (1973). A reliability coefficient for maximum likelihood factor analysis. *Psychometrika*, 38, 1-10. doi:10.1007/BF02291170
- van Niekerk, J. K., Huppert, F. A., & Herbert, J. (2001). Salivary cortisol and DHEA: Association with measures of cognition and well-being in normal older men, and effects of three months of DHEA supplementation. *Psychoneuroendocrinology*, 26, 591-612. doi:10.1016/S0306-4530(01)00014-2
- Viena, T. D., Banks, J. B., Barbu, I. M., Schulman, A. H., & Tartar, J. L. (2012). Differential effects of mild chronic stress on cortisol and S-IgA responses to an acute stressor. *Biological Psychology*, 91, 307-311. doi:10.1016/j.biopsycho.2012.08.003
- Vining, R. F., McGinley, R. A., & Symons, R. G. (1983). Hormones in saliva: Mode of entry and consequent implications for clinical interpretation. *Clinical Chemistry*, 29, 1752-1756.
- Warren, M. T., Wray-Lake, L., Rote, W. M., & Shubert, J. (2016). Thriving while engaging in risk? Examining trajectories of adaptive functioning, delinquency, and substance use in a nationally representative sample of U.S. adolescents. *Developmental Psychology*, 52, 296-310. doi:10.1037/a0039922

Closing Commentary


The results from the study reported in this Chapter provide further evidence of the relationships between basic psychological needs satisfaction (BPNS) and challenge appraisal with functioning (see Chapters 2, 3, and 4) and, more importantly, offer the first evidence for pre-game levels of BPNS and challenge appraisal predicting in-match thriving in sport performers. Although further work is still required to ascertain the temporal precedence of these two process variables, BPNS and challenge appraisal offer two exciting pathways through which thriving can be facilitated in sport performers. Furthermore, they offer researchers a framework to investigate the indirect effects of possible enabler variables on thriving (see Chapters 2 and 3 for examples). To extend understanding of thriving in sport performers yet further, however, it is necessary to extend the analytical lens used from focussing on specific relationships between variables, to a broader perspective encompassing all aspects of performers' match experiences. Such an investigation may provide further clarity for the pathways supported in this Chapter, whilst also identifying other factors that may be critical for the manifestation of thriving and non-thriving experiences. This rationale drove the study design implemented in the study presented in Chapter 6.

The findings reported in this Chapter provide only limited evidence to support the suggestion that salivary biomarkers of thriving exist (cf. Epel et al., 1998; Mendes et al., 2007). This latter finding raises critical questions about how best to conduct a physiological measurement of thriving in real-life situations. Furthermore, it highlights the challenges of measuring sport performers' hormone responses to stress and of using these measurements to predict their in-game functioning.

Chapter 6. A Comparison of Thriving and Non-Thriving Elite Hockey Players' Match Experiences

Introductory Commentary

In Chapter 3 it was reported that sport performers' levels of in-match functioning can be examined using indices of subjective performance and well-being, and that athletes with a high-level of functioning are thriving. To further understanding of the factors that lead to thriving, the studies presented in Chapters 4 and 5 then examined the relationships between two process variables (viz. basic psychological needs, challenge appraisal) previously identified within the broader thriving literature and athletic thriving. These quantitative studies provide an initial foundation for understanding thriving in sport performers; however, the assessments are restricted to pre-specified phenomena and, therefore, are unable to identify effects from spontaneously occurring variables (e.g., injury) or factors outside of those measured. To capture the breadth of sport performers' match experiences and elicit a greater awareness of other factors that may be pertinent to thriving in sport, the study presented in this Chapter reports findings from an analysis of interviews conducted with elite hockey players following an important sport encounter. To extend understanding beyond solely thriving performers (cf. Brown et al., 2017), a comparative analysis is conducted on the experiences of individuals who thrived and those who did not.

This declaration concerns the article entitled:							
A Comparison of Thriving and Non-Thriving Elite Hockey Players' Match Experiences							
Publication status (tick one)							
draft manuscript	<input checked="" type="checkbox"/>	Submitted	<input type="checkbox"/>	In review	<input type="checkbox"/>	Accepted	<input type="checkbox"/>
Publication details (reference)	Brown, D. J., Arnold, R., Fletcher, D., & Standage, M. (2017). <i>A comparison of thriving and non-thriving elite hockey players' match experiences</i> . Manuscript in preparation.						
Candidate's contribution to the paper (detailed, and also given as a percentage).	<p>Formulation of ideas: The candidate was predominantly responsible for the conceptualization of the paper, and the use of a mixed methods approach. Candidate contribution = 75%</p> <p>Design of methodology: The candidate contributed considerably to the design of methodology used in the study, and the identification of suitable data collection and analysis techniques. Candidate contribution = 75%</p> <p>Experimental work: The candidate was responsible for the collection of all data in the study and for running all analyses. Candidate contribution = 95%</p> <p>Presentation of data in journal format: The candidate drafted the manuscript in its entirety and formatted it according to journal specifications. The remaining authors read revisions of the manuscript and provided comments accordingly. Candidate contribution = 80%</p>						
Statement from Candidate	This paper reports on original research I conducted during the period of my Higher Degree by Research candidature.						
Signed						Date	24/04/2017

Evidence of permission to use published paper: N/A

Data access statement: To be provided following the acceptance of the manuscript in a journal.

6.1 Abstract

Extant research has explored and examined how sport performers thrive in competitive scenarios; however, to date, limited inquiry has focused on how thriving differs from other types of responses (e.g., managing, succumbing). The aim for the current study, therefore, was to use mixed methods to explore and compare the experiences of sport performers who thrived in an important competitive fixture and those who did not. Quantitative assessments of elite hockey players' in-match functioning were used to identify thriving ($n = 8$) and non-thriving ($n = 10$) performers and, using this distinction, qualitative interviews were then conducted with these individuals to explore their match experiences. Applied thematic analysis of interview transcripts revealed 52 codes and 148 relationships between codes that were pertinent to players' match experiences. Although the majority of codes emerging were similar across the two groups, substantial differences existed in the expression of these codes and in the relationships between them. These findings have important implications for understanding how and why sport performers experience competitive situations differently, and offer coaches and practitioners a better understanding of facilitating thriving in athletes.

6.2 Introduction

Significant sporting encounters can have substantial effects on athletes, coaches, organizations, and nations. For example, the outcome of the encounter may result in the successful or unsuccessful conclusion of a sporting season, selection or deselection, and changes in an athlete's psychological state (e.g., increased confidence). Furthermore, results in these competitions may stimulate investment from sponsors and determine future government funding (cf. UK Sport, 2015). In light of the substantial impact that these events can have on sport performers, there is a need to better understand how to promote more adaptive outcomes in these situations and enable athletes to thrive; that is, to experience development and success (Brown, Arnold, Fletcher, & Standage, in press; see Chapter 2).

Research on thriving in sport performers has typically been sparse and divergent, with scholars adopting different interpretations of the construct (see, e.g., Galli & Reel, 2012; Gucciardi, Jackson, Hodge, Anthony, & Brooke, 2015). Recent inquiries, however, have begun to examine thriving in a more systematic fashion and have employed a common definition. Within this work, thriving has been

determined by the level of functioning displayed by sport performers, which is assessed using measures of subjective performance and well-being (cf. Brown, Arnold, Fletcher, et al., in press; see Chapter 2). Specifically, individuals reporting highest levels of performance, hedonic and eudaimonic well-being were identified as high-functioning and, therefore, labelled as 'thriving' (Brown, Arnold, Standage, & Fletcher, 2017b; see Chapter 3). Furthermore, the likelihood of membership to the thriving profile was found to be predicted by personal resilient qualities and psychological skills use enabler variables, and basic psychological need satisfaction and frustration process variables. To extend this finding, the relationships between various process variables and thriving was, subsequently, assessed longitudinally over time (Brown, Arnold, Standage, & Fletcher, 2017a; see Chapter 4) and using diary methods (Brown, Arnold, Standage, Turner, & Fletcher, 2017; see Chapter 5). Collectively, these two studies demonstrated that sport performers' pre-match perceptions of BPNS and challenge appraisal impacted their in-match functioning, with elevated levels of BPNS and challenge appraisal related to higher levels of functioning. Although Brown and colleagues extant work has extended understanding of thriving and its association with certain enabler and process variables in sport performers, it is limited by its inability to capture the holistic experiences of individuals and any occurrences influencing thriving that are outside of the measured phenomena (cf. Johnson & Onwuegbuzie, 2004).

In order to garner a broader appreciation of possible experiential components of thriving, it is necessary to obtain in-depth accounts of individuals' experiences. Within the wider sport psychology literature, interviews have been extensively used to collect such data on particular components of a performers' sporting experiences including their coping responses (e.g., Salim, Wadey, & Diss, 2016), motivations (e.g., Mallett & Hanrahan, 2004), and integration with team members (e.g., Benson, Evans, & Eys, 2016). Furthermore, interviews have been used to explore athletes' accounts of their sporting careers (e.g., Debois, Ledon, & Wylleman, 2015) and significant milestones (e.g., Poczwadowski, Diehl, O'Neil, Cote, & Haberl, 2014); however, rarely have these interview studies focused in on a specific sporting encounter or has data collection occurred imminently after the event has occurred. Although delayed retrospective interviews may afford participants greater time for reflection after the event and enable them to respond less emotively (cf. Hutchinson & Wilson, 1992), they may be limited if participants are unable to accurately recall

the event of interest, or their perceptions of the event have altered based on the impact it had on them (cf. Porta, 2014). To overcome these limitations and elicit more accurate data, it therefore appears necessary to employ an approach whereby participants' experiences of a specific competitive event are captured immediately, or soon after, it occurs.

Qualitative investigations have also been conducted within the thriving literature, with interviews or focus groups employed to explore thriving in a range of populations including adolescents (see, e.g., King et al., 2005), students (see, e.g., Meuleman, Garrett, Wrench, & King, 2015), teachers (see, e.g., Sumsion, 2004), and individuals operating within elite sport (Brown, Arnold, Reid, & Roberts, 2017). To elaborate on the latter study, athletes, coaches, and sport psychology practitioners were interviewed to explore thriving and its characteristics (e.g., positive mental state, success), outcomes (e.g., happiness, increased confidence), and facilitators (e.g., teammate support, positivity and confidence). In addition to identifying pertinent codes, Brown, Arnold, Reid, et al. (2017) suggested that interactions existed between some of the personal (e.g., desire and motivation) and contextual (e.g., coach support) enablers perceived to facilitate thriving. Although these findings provide the first exploration of thriving from multiple stakeholders in elite sport, the study did not consider responses other than thriving (e.g., managing, succumbing). Thus, it may be the case that the codes and relationships presented as exclusive to thriving also exist within a range of non-thriving responses. To offer a relevant comparison for the accounts of individuals who thrive and to capture the breadth of sport performers' experiences in sport, investigations should therefore also collate the accounts of individuals who display lower levels of functioning. In addition to identifying the uniqueness of codes and relationships, this approach would enable comparisons to be drawn on the expression of codes and relationships emerging within both groups (cf. Guest, MacQueen, & Namey, 2012).

One approach that could be used to provide coverage of these experiences and to retrieve the accounts of representative individuals within a timely fashion is a mixed methods design (cf. Johnson & Onwuegbuzie, 2004; Moran, Matthews, & Kirby, 2011). To elaborate, quantitatively determining sport performers' levels of functioning immediately after a sporting encounter would allow for the identification of individuals who thrived and those who did not. Using this distinction, qualitative interviews could then be conducted with these individuals shortly after the

competitive event to explore their match experiences (see, e.g., Swann, Keegan, Crust, & Piggott, 2016). Thus, this mixed methods approach would represent a pragmatic option that could overcome the aforementioned limitations pertinent to extant thriving literature, which has typically been conducted using either a quantitative or qualitative method (cf. Giacobbi, Poczwadowski, & Hager, 2005; Moran et al., 2011). Based on this premise, the aim of the current study was to use mixed methods to explore and compare the experiences of elite sport performers who thrived in an important competitive fixture and those who did not. Guiding the study were four research questions: (i) are some match experience codes present for one group but not the other?; (ii) if a match experience code is present for both thriving and non-thriving groups, is the expression of that code different between them?; (iii) are some relationships between match experience codes present for one group but not the other?; and (iv) if a relationship is present for both thriving and non-thriving groups, is the expression of that relationship different between them?

6.3 Method

6.3.1 Design

To answer the research questions in this study, an exploratory sequential research design was employed with quantitative data used to identify two groups of participants for follow-up qualitative inquiry (Creswell & Plano Clark, 2011; Guest et al., 2012). More specifically, quantitative assessments of athletes' functioning in a sporting encounter were used to identify the highest and lowest functioning performers within teams. Individual interviews were then conducted with each of the selected participants to allow their match experiences to be fully explored and understood (Kvale & Brinkmann, 2008). Next, participants were separated into a high-functioning 'thriving' group and non-thriving group, and a comparative approach to thematic analysis was pursued (Guest et al., 2012).

6.3.2 Participants

Forty-four elite male field hockey players ($M_{age} = 25.17$ years, $SD_{age} = 4.45$) were initially recruited for this study following their involvement in a previous study (cf. Brown, Arnold, Standage, Turner, et al., 2016; see Chapter 5). From this sample, 18 players ($M_{age} = 24.22$ years, $SD_{age} = 4.19$) were then purposefully sampled to take part in an interview (see Section 6.3.3 for details). The 18 players

had an average of 16.12 ($SD = 5.74$) years' experience playing hockey. Sixteen of the participants had played hockey at either a junior or senior international level, and all players were currently playing at either premier division level or higher. Interviewees' playing positions included goalkeeper, defender, midfielder, and forward.

6.3.3 Procedure

Following institutional ethical approval, coaches of three elite hockey teams were contacted via email to inform them about the nature of the study and to invite their teams to participate. Upon agreement with the coaches, players were approached and informed about the study, made aware of appropriate ethical considerations (e.g., anonymity, right of withdrawal), and requested to sign an informed consent form. Players willing to take part in the study were then asked to complete a questionnaire following a competitive sporting encounter to assess the level of functioning displayed (for details of this assessment, see, Brown, Arnold, Standage, Turner, et al., 2017; Chapter 5). The three players with the highest and lowest functioning scores from each team were invited for an interview; where individuals were unavailable or declined to be interviewed, alternative participants were contacted. Interviews were conducted within seven days of each team's respective competitive fixture, with the three fixtures occurring in a seven month window. All 18 interviews were semi-structured, directed using an interview guide (see Interview Guide Section 6.3.4 below), and were digitally recorded in their entirety. The duration of interviews ranged from 27.42 to 62.49 minutes ($M = 46.39$, $SD = 10.32$) and the audio recordings were transcribed verbatim.

6.3.4 Interview Guide

The interview guide (see Appendix Three) was developed to elicit greatest exploration of the participants' match experiences. To initiate conversation between the interviewer and participant, the first questions asked the players descriptive questions about their experiences in hockey and how they got involved in the sport (cf. Patton, 1990). Next, to focus dialogue on the sporting encounter of interest, participants were asked about their experiences in the game and how they felt the fixture went for them. Following this, conversation was directed towards performers' preparation for the fixture, factors that may have influenced their potential to thrive, and how they felt before the match. For example, participants

were asked “Can you tell me about your preparation for the game?” and were then asked to comment on whether they felt their preparation affected their experience in the match. Returning to participants’ in-match experience, players were then asked to elaborate on their functioning scores and provide context for the scores they reported. The final section of the interview guide included questions pertaining to the duration of the participants’ in-match experiences. The semi-structured nature of the interview guide allowed sufficient flexibility in questioning to garner participants’ personal experiences to the fullest extent, whilst also providing enough structure to enable comparisons to be made between participants (Bernard & Ryan, 2010; Guest et al., 2012).

6.3.5 Data Analysis

The exploratory sequential quan → QUAL design used in this study resulted in a three-step data analytic approach. First, to identify participants who thrived and those who did not, functioning scores for interviewed participants were ranked with those computed for the full sample. Participants who were ranked in the highest quartile of the full sample were considered to be thriving, with the remainder of the sample considered not to be thriving. The decision to separate the sample into quartiles, was grounded in the identification of four distinct profiles for functioning responses previously found in extant literature (see, Brown, Arnold, Standage, et al., 2016b; see Chapter 3). Second, interview transcripts within in each group were analysed using applied inductive thematic analysis as described by Guest et al. (2012). Specifically, grouped transcripts were read thoroughly by a first coder who then identified themes within the text and refined the themes into codes. The clarity of these codes was then checked by a second coder and, once consensus was established, both coders independently applied the codes to a sample of text. The results of the coding were compared and, where necessary, codes were edited, merged, or added to describe new themes within the data. This process was repeated eight times to ensure coding was reliable. To illustrate the relationships (as borne out by the data) between codes within each group, an aggregated conceptual model was constructed to depict the experiences of hockey players who thrived (cf. Guest et al., 2012; Guest et al., 2008). This process was then repeated for the non-thriving group. In the third stage of the analysis, the codes and conceptual models were compared and contrasted to identify areas of similarity and difference between the two groups and, ultimately, to provide an understanding of what may have resulted

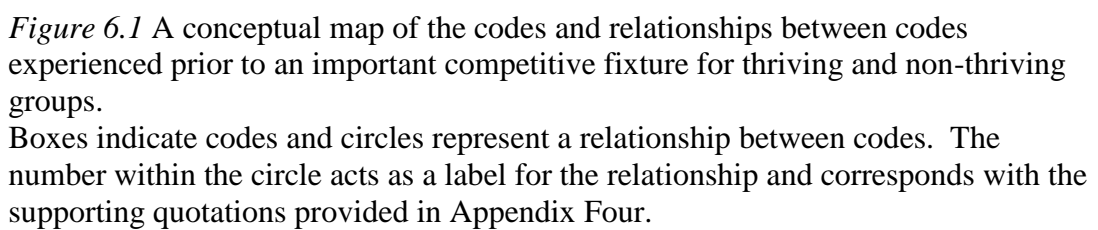
in the differential match experiences (cf. Guest et al., 2012). Where codes and relationships appeared in both data sets, pertinent sections of interview transcripts were compared to explore any variability in the expression of the code/relationship (e.g., whether it was perceived positively or negatively, whether the variable coded increased or decreased). To aid reader interpretation, the conceptual models depicting the codes and relationships for the two groups were combined graphically in Figures 6.1-6.3, and illustrative quotes relevant to each of the research questions are presented in the Results section below. Further supporting evidence for the remaining codes and relationships is available in the Appendix Four.

6.4 Results

Of the 18 participants interviewed, eight were included in the thriving group ($M_{Functioning} = 1.40$, $SD_{Functioning} = 0.55$), and 10 were included in the non-thriving group ($M_{Functioning} = -0.81$, $SD_{Functioning} = 1.46$); the non-thriving group contained participants from the three lowest quartiles. Replacement participants were only recruited once for the high functioning group, but nine times for the lower functioning group. A total of 52 codes were identified from the two data sets and these are represented as boxes in Figures 6.1-6.3. Figures 6.1, 6.2, and 6.3 capture the codes and relationships between codes pertinent to performers' match experiences prior to, during, and following an important competitive fixture, respectively; some of the codes are included in multiple figures. *Preparation*, *pre-match feeling*, and *in-match feeling* codes included lower level codes. More specifically, *preparation* included atypical, typical, stress-free, rushed, and sub-optimal lower level codes. Participants' pre-match feelings comprised determined, nervous, relaxed, excited, confident, and uptight. *In-match feeling* had lower level codes of nervous, confident, energetic/good, and frustrated. The following section is organized under each of the four research questions within which exemplar codes or relationships will be presented and discussed using supporting evidence from the thriving and non-thriving groups.

6.4.1 Are Some Match Experience Codes Present for One Group but not the Other?

Of the 52 codes emerging from the data, 35 were present for both the thriving and non-thriving hockey players, four were present for only the thriving hockey players and 13 were only present for the non-thriving players. Codes unique to the



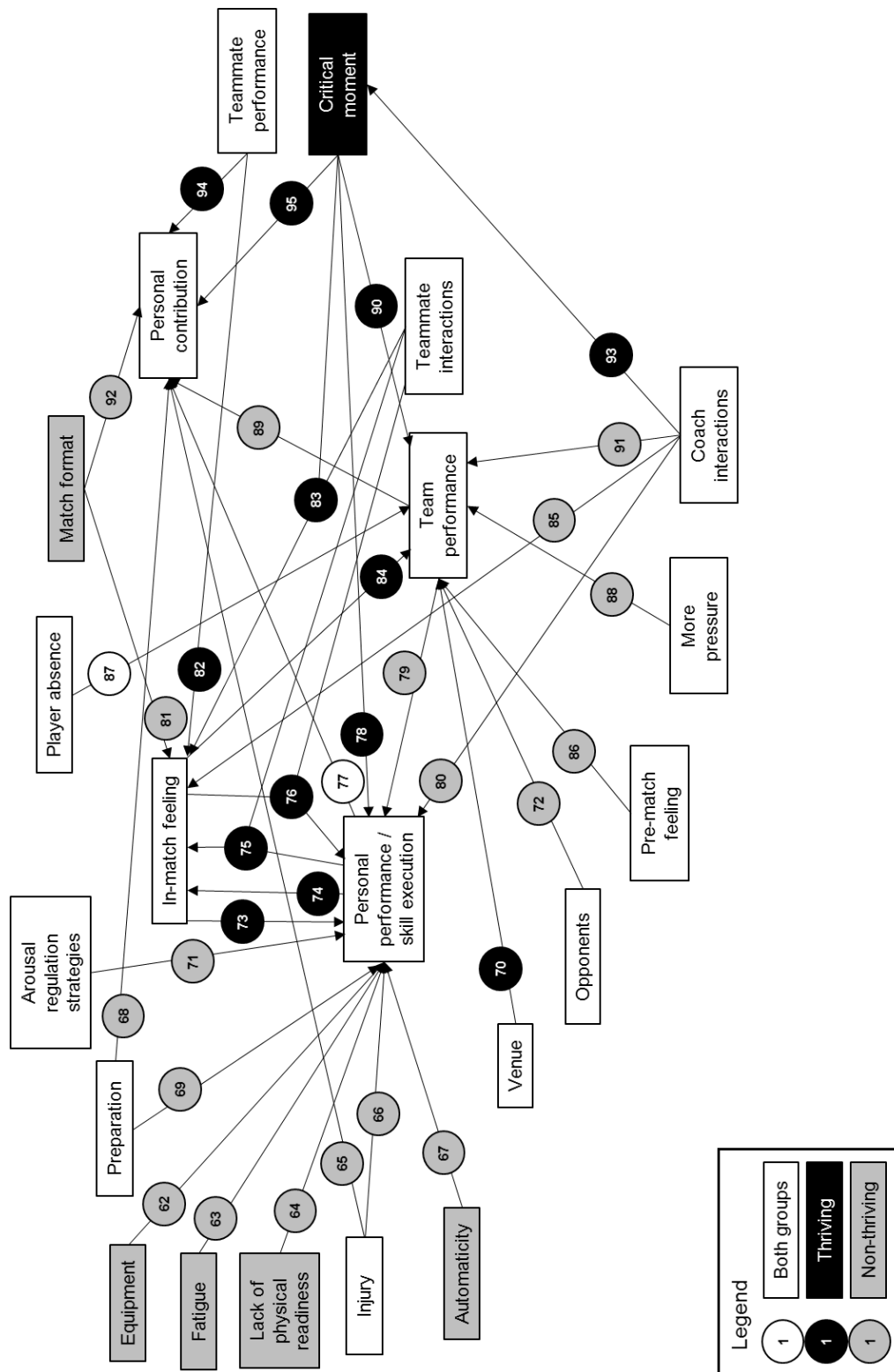


Figure 6.2 A conceptual map of the codes and relationships between codes experienced during an important competitive fixture for thriving and non-thriving groups.

Boxes indicate codes and circles represent a relationship between codes. The number within the circle acts as a label for the relationship and corresponds with the supporting quotations provided in Appendix Four.

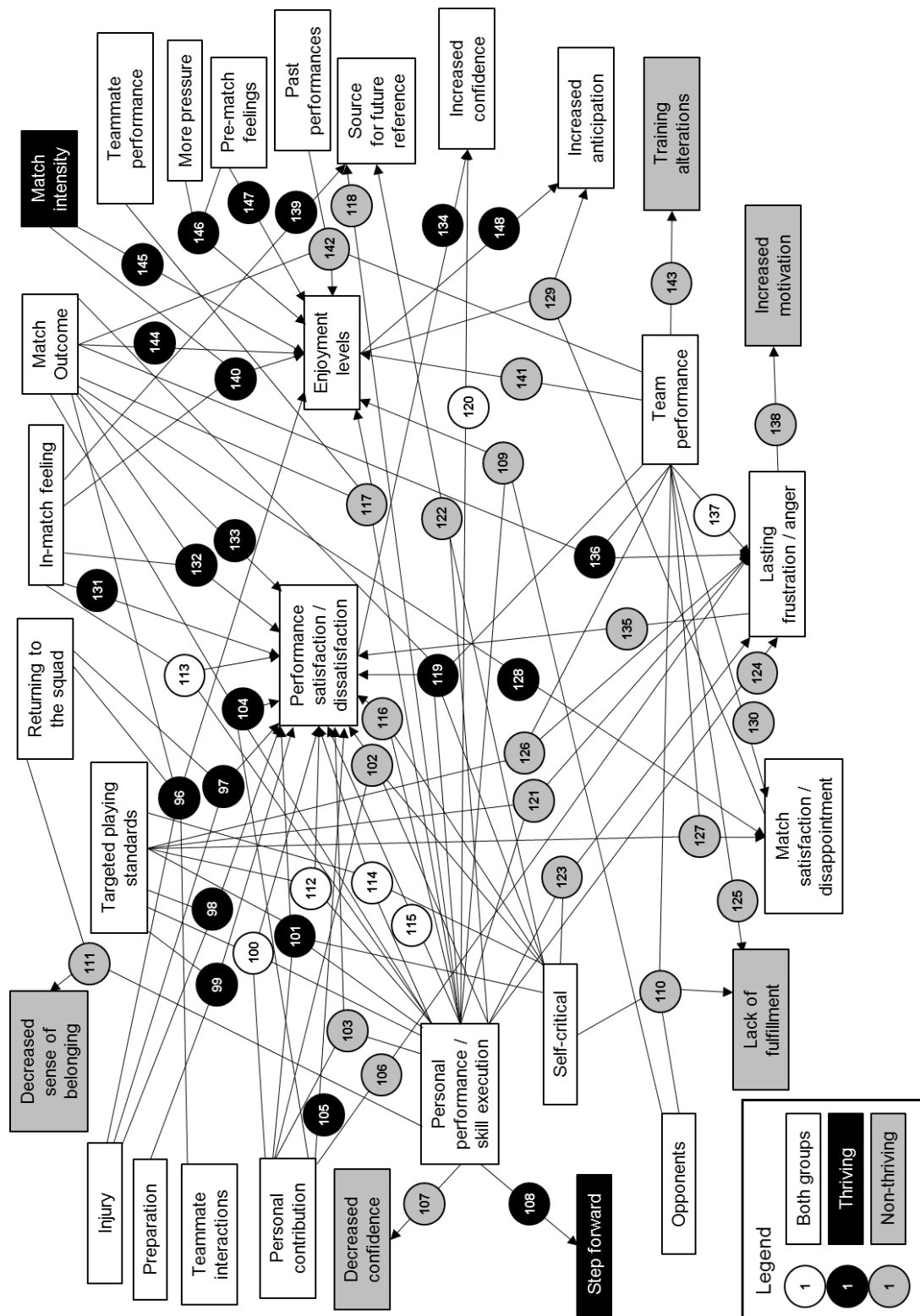


Figure 6.3 A conceptual map of the codes and relationships between codes experienced following an important competitive fixture for thriving and non-thriving groups.

Boxes indicate codes and circles represent a relationship between codes. The number within the circle acts as a label for the relationship and corresponds with the supporting quotations provided in Appendix Four.

thriving group of hockey players included: *sense of cohesion*, *critical moment*, *match intensity*, and *step forward*. For example, three of the participants in the thriving group described experiencing a *critical moment* that changed their match experience. For one individual, this was the half-time interval as it meant he was able to separate his negative first half experience and his positive second half experience; this is illustrated in the exchange between the participant and interviewer below:

It was a game of two halves. The first half I think was pretty bad. I think in hindsight it wasn't maybe as bad as I thought but the second half was much better. The second half was probably as confident as I've been in that league...

Why was the second half better?

It can be simple things like if you just trap a ball and make a good pass or if you do anything well it builds your confidence and then the next time you get the ball you do something good again and it just snowballs.

Participants in the thriving group also spoke of the impact that *match intensity* had on their experiences, as the following extract illustrates:

I just really enjoyed the game, the intensity, the speed of it, enjoyed my feeling. I didn't feel unfit or out of breath, if anything, I felt the opposite, that I could have continued on and on. And that's always a nice feeling that you take with you during and after the game.

A further code that was unique to the thriving group was *step forward*. This aspect of experience was reported by one of the participants in this group, and is captured in the extract below:

I'm always thinking in terms of what has this [match] done to help me secure a more permanent place in the team and I think that was definitely a big step in the right direction. Not just from how I played as a game but in communicating afterwards and talking through it.

A collection of codes also emerged for the non-thriving participants, but not for the thriving group. These include *fatigue*, *lack of physical readiness*, *late selection*, *resilience*, *lack of focus*, *automaticity*, *equipment*, *match format*, *decreased sense of belonging*, *decreased confidence*, *increased motivation*, *lack of fulfilment*, and *training alterations*. For example, one participant described how a *lack of physical readiness* impacted his match experience: "I guess the physical factors

would have definitely affected my performance. I wasn't feeling in great shape. So I maybe ... hindered what I maybe wanted to do, or how much running I could actually have done". The *match format* was discussed by two of the participants in the non-thriving group. The following extract illustrates how one of the participants perceived the match format to detrimentally impact his experience:

Like I said with the breaks in the game it wasn't easy to get into the game so, I don't know, I think it is difficult because you have only got fifteen minutes per quarter which makes a massive difference compared to obviously thirty-five minutes.

To illustrate the *lack of fulfilment* code, the quotation below captures how one member of the non-thriving group considered his match experience to be unfulfilling:

It wasn't as fulfilling as some of the other games – I think it was the way the game finished, we went five one up, we were playing reasonably, had a good run of play and we sort of took our foot off the pedals, and we finished conceding a couple of goals and it sort of finished the game – I'm not a sour head, but it was just like a damp squid, it all fizzled out into nothing.

6.4.2 If a Match Experience Code is Present for Both Thriving and Non-Thriving Groups, is the Expression of that Code Different Between Them?

Of the 35 codes to emerge that were present for both groups, 18 were expressed differently between the two (viz. *workload*, *injury*, *returning to squad*, *coach interactions*, *teammate interactions*, *opponents*, *targeted playing standards*, *preparation*, *more pressure*, *pre-match feeling*, *teammate performance*, *in-match feeling*, *personal performance/skill execution*, *personal contribution*, *match outcome*, *enjoyment levels*, *performance satisfaction/dissatisfaction*, and *lasting frustration/anger*). The remaining 17 codes (viz. *travelling*, *venue*, *crowd*, *past performances*, *familiarity*, *expectations*, *perceived match importance*, *arousal regulation strategies*, *less pressure*, *self-critical*, *player absence*, *team performance*, *match satisfaction/dissatisfaction*, *increased confidence*, *increased anticipation*, *source for future reference*, and *no effect*) were expressed comparably. To illustrate the difference in code expression, although members of both groups experienced atypical, typical, stress-free, rushed, and sub-optimal *preparation*, the thriving group

expressed their *preparation* more positively than members of the non-thriving group. For example, when discussing their atypical preparations for the match, a thriving group member expressed that “Probably with that earlier wake-up, I had more than enough time to get all my stuff together and, yeah, I was pretty relaxed and ready to go”, whereas a non-thriving group member described their atypical preparation as follows:

Because of being at [venue name], it was slightly different as we got there a little bit earlier, which meant that we met at a different time which wasn't ideal really, because I like to try and get [my preparation] sorted as the usual routine.

Similarly, the expression of the *more pressure* code differed between groups. More specifically, participants in the thriving group perceived the increased pressure positively, as the following extract illustrates:

I can understand in a sense that it [the game being my last match] might have put more pressure on me, but I actually think that I didn't let it hurt me, because I quite like having that mind-set of ‘right, this is it, I've got seventy minutes to just put all my effort in, all my energy in’ and there's nothing else on the pitch. Quite enjoyed it.

In contrast, members of the non-thriving group perceived the increase in pressure to detrimentally impact their match experience. The following exchange between the interviewer and a participant in the non-thriving group illustrates this:

You mentioned earlier you feel like as a team you didn't turn up.

Yeah.

Why do you think that might've been the case?

I think possibly because there'd been such a focus on one game and obviously the outcome of one game. I think something like that is enough in terms of pressure and nerves or whatever, to make a lot of people think, ‘right well this is it, we've played eighteen games this season, to get to this one game and so much of our training and so much of our preparation has been for this game’. I guess just the thought of that has the potential to pile on that extra pressure and create those extra nerves; that'd probably be the main thing I would say to be honest.

Turning to examples of codes where members of both thriving and non-thriving groups expressed similar experiences, participants reported using various

arousal regulation strategies to enable them to stay relaxed. For example, the following extract from an interview with a participant in the thriving group illustrates how he chose to avoid thinking about the imminent match:

I just like to chill out in the morning ahead of the game. I don't like to think about it too much ... as soon as we got to [venue name] I had a bit of banter before the game ... I tried to just keep myself busy and not think about the game too much before I had to, so I went and watched a few of the other games that were going on.

A similar approach was adopted by a participant in the non-thriving group, as the following extract demonstrates:

For me, I know how to get myself ready and if I find myself thinking about a game all the time, then I almost get too into it and too hyped up, and I'm not at my best then. So, being relaxed, not thinking about it too much, just playing hockey, playing on instinct, that makes it a lot easier for me to play the best I can.

The *self-critical* code is an example of another factor that impacted the match experiences of participants' in both groups. In the extract below, a participant in the thriving group illustrates how he is critical of his own performance:

I was pretty happy. I just have to do my role to the best of my ability and I'm my number one critic ... they always say that consistency is the most important thing at the highest level and that's all I aim to be, consistently good and sound. And I was overall pretty happy.

Participants in the non-thriving group were also *self-critical* of their performance, as the following quote highlights:

You know it was kind of like 'that frankly wasn't good enough ... It has happened now, let's make sure that we don't do anything else wrong again'. And then the last goal may be a bit over critical but I still think – when the ball came across goal I saw somebody trying to come in for a deflection and they missed it, it's still a bit hard, but that is still something I should be saving.

6.4.3 Are Some Relationships Between Match Experience Codes Present for One Group but not the Other?

In total, 148 relationships were identified between codes, with 13 apparent in both groups, 58 unique to the thriving group, and the remaining 77 found only in the

non-thriving group. Although it is not possible to present examples for all of these within the text, all relationships are depicted by the numbered paths included in Figures 6.1-6.3. In addition, the figures illustrate which relationships were found across both groups or within one of the two groups.

To illuminate some of these relationships, four paths (38, 39, 51, 56) were identified linking *past performances* to *pre-match feeling*. Within the thriving group, *past performances* were found to combine with the *opponents* (see path 38) and *familiarity* (see path 51) codes to impact *pre-match feeling*. In contrast, within the non-thriving group, *past performances* were related to *pre-match feeling* independently of other codes (see path 56) and in combination with *opponents* and *expectations* (see path 39). Below are two extracts to illustrate paths 38 and 56, respectively. Within the first quotation, a member of the thriving group described how the *opponents* for the match and his team's *past performances* against that opponent resulted in him feeling confident. The second quotation, from a non-thriving group member, illustrates the independent relationship between *past performances* and *pre-match feeling*.

I was pretty confident going into the game. We'd beaten [opponents' name] twice this season already and, the previous games we've played, we've played really well. We beat two other tough teams, so I felt like we really had the momentum going into the game.

We had some good results against some good teams ... so I think we were pretty confident. Yeah, I'd definitely say we were quite confident and we could go and get into the final and probably win the tournament, or win the play-offs as well.

In relation to factors impacting *personal performance/skill execution*, participants in the non-thriving group identified nine factors (e.g., *automaticity*, see path 67; *equipment*, see path 62; *fatigue*, see path 63; *preparation*, see path 69) that had either a positive or negative relationship. To illustrate path 69 for example, one participant in the non-thriving group stated "That [my preparation] was the main factor why I think I played so poorly. Probably...I knew I wasn't mentally prepared. As in, I was conscious that I wasn't up for it, so that was probably why yea". In comparison, only two independent (see paths 73, 78) and one combined (see path 76) path emerged for the thriving group. The quotation below from a thriving group member elucidates the relationship between *teammate interactions* and *in-match*

feeling with personal performance/skill execution depicted in path 76:

I think in the first half, yes you can argue there was a mix up [between me and one of the other players], but I think because I got nervous I stopped talking and normally I'm one of the better ones for chatting away because I consciously do it as a means to work my way into the game and I think that was quite damaging.

All of the paths impacting participants' *enjoyment levels* depicted different relationships for the thriving and non-thriving groups. More specifically, paths 96, 140, and 144-147 highlight factors identified by the thriving group, and paths 109, 117, 142, 141 represents relationships emerging for the non-thriving group. For example, participants in the non-thriving group discussed how *teammate performance* (see path 117) and *team performance* (see path 141) impacted their *enjoyment levels*. One participant simply stated that "Enjoyment would have been better if we had been playing better as a team." Teammates were also impactful for one thriving group member; however, he described how *teammate interactions*, combined with *injury, returning to the squad*, and the *match outcome*, resulted in greater enjoyment. This is illustrated in the extract below:

Obviously, I hadn't played for a while [due to the injury], it's really good to be back playing and you can go to the gym and do your running and stuff and it's just a completely different feeling to actually going out there with your mates and winning a decent game. So that obviously contributes to it [enjoyment], as I haven't done it [played hockey] for quite a few weeks.

6.4.4 If a Relationship is Present for Both Thriving and Non-Thriving Groups, is the Expression of that Relationship Different Between Them?

Thirteen relationships emerged that were present for both the thriving and non-thriving groups. Of these, four were expressed differently (viz. paths 26, 100, 112, 115), with the remaining relationships experienced comparably (viz. paths 18, 45, 49, 77, 87, 113, 114, 120, 137). Path 26 captures the relationship between participants' *workload* and their *preparation* for the match. For a participant in the thriving group, playing a match on a Friday meant that he didn't have work and his *preparation* was stress-free. More specifically, he stated that "Sometimes I do bring that [bad mood] into games, if they're friendly matches here or an away trip, but because Friday I didn't have any coaching I was pretty stress-free." In contrast, one member of the non-thriving group who was playing in the same match, stated how

he felt his and his teammates' *workload* meant their *preparation* was rushed; this is described in the extract below:

I think everyone working that day definitely did affect the group environment. Because everybody came in and you could tell everyone was rushed and trying to get themselves sorted out. There definitely wasn't as much interaction between players. Because I think they all had to put themselves out of their work-world and into playing mode.

In a second example of a relationship that was expressed differently by participants in the two groups, path 100 captures the interaction between players' *targeted playing standards*, *personal performance/skill execution*, and *personal contribution* on *performance satisfaction/dissatisfaction*. In the extract below from an interview with a member of the thriving group, the participant states how his performance satisfaction score was impacted by his perceived skill execution against the playing standards he had set, and his positive contribution to the match:

I think from what I mentioned earlier, which I wasn't expecting myself – I based that [subjective performance] score on sort of not how many players I beat or anything like that, it's being as consistent as I can be, especially being back in that game. The breakdown of skills is probably what I would look at and make sure my pass completions are pretty good and I'm not making any unforced errors. I knew that maybe I was going to have a couple of things that weren't quite at the top of my game but I rate myself on that in terms of how much I competed with the opposition. I guess, how much of a positive influence I felt I was having as opposed to if they [the team] didn't have me.

In contrast, one member of the non-thriving group experienced this relationship differently, with *targeted playing standards*, *personal performance/skill execution*, and *personal contribution* having a negative effect on *performance satisfaction/dissatisfaction*. This is illustrated in the extract below:

I didn't feel I did anything to help the squad. I actually felt like I hindered the team. I've set myself standards and I didn't meet any of them. Even defensively-wise, a couple of times I left the boys...yea I've set standards forward and defensively and I didn't complete both of them, I didn't get near them. That's probably why I gave myself overall a 0. Probably a 1 if I look back on it.

Turning to the comparable expression of relationships, path 49 captures the relationship between *teammate interactions* and participants' *pre-match feeling* and which resulted in positive feeling in both groups. For example, the first extract below from a thriving group member suggests that the interactions resulted in him feeling confident and positive about the imminent match. In the second quotation, a non-thriving group member states that these interactions contributed to him feeling relaxed.

Going back to [teammate name] doing laps of the changing room, you always find in the warm up there will be [teammate name] and [teammate name] will be like just positive vibes, positive vibes, like loads of chat and consciously going round and interacting with everybody in the group and I feel that is really effective at getting everyone a) together and b) very positive and psyched up.

On Saturday I was really relaxed, I was quite chilled, and I was humming, while usually I go quite quiet, but I was having some chat, some banter, with the boys and stuff. Yeah, I just felt pretty good. I felt relaxed and ready to play.

The relationship between *player absence* and *team performance* (see path 87) was also expressed comparably across groups. For example, a participant in the thriving group stated that "I really enjoyed it, it was probably not the best hockey that we've played but it was a pretty intense game with both teams missing a few people, the intensity was still pretty good so, I really enjoyed it", suggesting that absent players negatively impacted the team's performance. A similar expression was provided by a non-thriving group member playing in the same match, "we had a few missing. So we had at least three missing, maybe more. So, it didn't matter too much, but a couple would have made a difference, to our slickness, probably".

6.5 Discussion

Extant research has explored and examined how sport performers thrive in competitive scenarios; however, to date, limited inquiry has focused on how thriving differs from other types of responses (e.g., managing, succumbing). The aim of the current study was to use mixed methods to explore and compare the experiences of elite sport performers who thrived in an important competitive fixture and those who did not. Analysis of interviews conducted with thriving and non-thriving players revealed 52 codes and 148 relationships between codes pertinent to their match

experiences. Of the 52 codes, 35 emerged in both groups and over half of these were expressed differently in the thriving and non-thriving players. Furthermore, of the 148 relationships borne out by the data, 135 were unique to either the thriving or non-thriving participants, and 13 were shared; four of these 13 relationships were expressed differently between groups. In summary, although the majority of codes emerging were similar across thriving and non-thriving participants, substantial difference exists in the expression of these codes and in the relationships between them. The discussion that follows reflects on why this may be the case by drawing on examples of the codes and relationships, rather than using the entirety of the data set.

Turning first to the emergence of codes, the recruitment of participants for both groups from the same matches meant that the sport performers shared a similar occurrence of some codes (e.g., different venue, crowd, opponents, match outcome). Furthermore, and beyond this, the participants shared codes that would be expected within any sample of sport performers reflecting on a match (e.g., personal performance/skill execution, enjoyment levels, team performance; see, e.g., Miles, Neil, & Barker, 2016; Swann et al., 2016) or within any investigation reflecting on athletes' experiences (e.g., injury, past performances, coach and teammate interactions; see, e.g., Morris, Tod, & Eubank, 2016; Sanders & Winter, 2016; Tamminen, Holt, & Neely, 2013). Where this study advances previous literature, is in the ability to elucidate codes that were unique to each group (see, Brown, Arnold, Reid, et al., 2017), and in the contrast that can be observed between the groups on codes that emerge within both sets of participants but are expressed differently (e.g., performance satisfaction/dissatisfaction, preparation, returning to the squad). For example, what is particularly interesting in the present study is that codes unique to the non-thriving group tended to be perceived more negatively (e.g., fatigue, lack of physical readiness) or had detrimental effects on participants' match experiences (e.g., automaticity, equipment), whereas those exclusive to the thriving group tended to be perceived more positively (e.g., critical moment, match intensity, sense of cohesion). Thus, it is plausible that the occurrence and perception of these 'positive' and 'negative' codes in the participants' match experiences, contributed to whether they thrived or not. To illustrate, a sense of cohesion apparent in the thriving group may be considered akin to feeling a valued part of a team, which has previously been highlighted as facilitating thriving in nursing staff (see, e.g., Liu & Bern-Klug,

2013). Conversely, experiencing fatigue or a lack of physical readiness would detrimentally impact vitality; a key indicator of thriving in work settings (see, Porath, Spreitzer, Gibson, & Garnett, 2012; Spreitzer, Sutcliffe, Dutton, Sonenshein, & Grant, 2005).

To elaborate on the common occurrence but different expression of codes across groups, coded factors may have varied in the extent to which they occurred compared to a typical match (e.g., workload), when they occurred (e.g., injury), or in the valence thriving and non-thriving participants attributed to them (e.g., returning to squad). For example, participants in the thriving group perceived re-joining the squad positively and appeared eager to do so. In contrast, members of the non-thriving group were tentative and considered returning to the squad to be difficult. These attributions add further support to the suggested role of positive perspective and proactive personality in facilitating thriving (see, e.g., Brown, Arnold, Fletcher, et al., in press; see Chapter 2; see also Sarkar & Fletcher, 2014). The different expression of match experience codes may also have arisen from the context participants perceived them. To illustrate, the lasting frustration and anger experienced by the participants in the thriving group focused on team performance, whereas frustration and anger experienced in the non-thriving group was expressed at both team *and* personal factors. This finding suggests that participants can experience a level of lasting frustration and still thrive within the match, so long as the anger is not evoked by personal factors (e.g., personal contribution). This differentiation of personal and team stimuli may provide tentative evidence to indicate that individuals can thrive independently of their team's performance or teammates experiences.

Moving discussion to the numerous relationships observed between codes, the results of the present study revealed that only nine of the 148 relationships emerging from the data were experienced comparably and across both groups. Examples of the few comparable relationships include the positive impact of teammate interactions on pre-match feeling, the detrimental effect of player absence on team performance, and the increase in confidence as a result of successful performance/skill execution. To elaborate further on the first example, members of both groups described how their exchanges with teammates before the match resulted in positive feeling (i.e., confidence, relaxed). The importance of teammates in providing this kind of social support is well-established within the

sport literature (see, e.g., Freeman & Rees, 2010; Galli & Reel, 2012; Hassell, Sabiston, & Bloom, 2010), and finding that comparable relationships existed between teammate interactions and pre-match feeling in both groups offers support to the suggestion that no differences exist in the perceptions of pre-competition social support between high and low performers (when classified using normative performance; see, Boat & Taylor, 2015). It does, however, challenge Boat and Taylor's (2015) finding that, when performance is assessed using self-referenced performance, successful performers perceive greater social support prior to competition.

The emergence of similarly expressed relationships was rare, and instead the majority of relationships depicted on Figures 6.1-6.3 were exclusive to either group or expressed differently. Within the thriving group for example, unique relationships were described linking participants' experiences of an injury with their expectations, targeted playing standards, preparation, arousal regulation strategies, and pre-match feeling. More specifically, experiencing an injury prior to the match resulted in sub-optimal preparation, but it also led to pre-match excitement and reduced targeted playing standards. These altered perceptions, in turn, then appeared to positively impact participants' evaluations of performance satisfaction/dissatisfaction. In contrast, relationships associated with injury in the non-thriving group reflected the impairment of an in-match injury on personal performance/skill execution and personal contribution. Whilst these relationships alone do not necessarily explain thriving and non-thriving, combined with the knowledge that thriving encompasses success and development (Brown, Arnold, Fletcher, et al., in press; see Chapter 2), it may be argued that the revised playing standards set by participants with a pre-existing injury enabled them to more readily experience success. In addition, given that thriving was determined using indices of performance and well-being in the current study, the impaired skill execution and match contribution resulting from an in-match injury would have precluded thriving through reduced subjective performance scores. Although these examples describe only a handful of the relationships identified in this study, they are particularly relevant for extant thriving literature as they are illustrative of the range of experiential components that need to be considered when attempting to explain sport performers' match experiences.

The results of the current study highlight the distinctions between thriving and non-thriving groups prior to, during, and following an important sporting

encounter, and, therefore, offer a variety of areas where practitioners and coaches can intervene to facilitate thriving in sport performers. First, the codes and relationships identified provide stakeholders with an appreciation of the complexity underpinning sport performers' match experiences and of the various factors that can impact whether they thrive or not within these. This offers practitioners and coaches insight into factors that may be perceived maladaptive by athletes (e.g., travelling, workload), that they could help remove or alleviate through primary stress management interventions (cf. Cooper & Cartwright, 1997). Furthermore, the relationships describe how codes are related within performers' match experiences. Given that these relationships often included performers' evaluations (e.g., of expectations, of familiarity, targeted playing standards), practitioners could work with athletes to ensure that these judgments are accurate and realistic to, ultimately, elicit desired outcomes. Second, amongst the codes that emerged in both thriving and non-thriving performers, there were a number that were experienced differently between groups and with the thriving group perceiving the code more positively (e.g., returning to the squad). Practitioners could work with athletes to ensure they appraise these occurrences in an adaptive manner, to positively impact performance and well-being (see, e.g., Williams, Cumming, & Balanos, 2010; Wolf, Eys, Sadler, & Kleinert, 2015). Third, participants' match experiences resulted in a number of lasting effects (e.g., increased confidence, source for future reference, step forward), that could be used as a vehicle to instigate a step-change in functioning and to facilitate future thriving (cf. Brown, Arnold, Standage, et al., 2017a; see Chapter 4).

Although the present study makes a significant advancement to the extant thriving literature, it is important to highlight its limitations. In accordance with previous research on thriving in sport performers (see, e.g., Brown, Arnold, Standage, et al., 2017b; Brown, Arnold, Standage, Turner, et al., 2017; see Chapters 3 and 5), thriving was determined by effective holistic functioning and observed through the experience of a high-level of well-being and a perceived high-level of performance; a quartile split was then used to differentiate between participants who thrived and those who did not. The decision to split the participants in this manner may be considered a limitation of the current study as it resulted in an arbitrary cut-off point and the possibility of some participants being incorrectly classified. For example, if more than a quarter of the sample thrived, then those outside of the top 25% would have been excluded from the thriving group, and their responses would

have been contrasted to, rather than combined with, participants demonstrating a comparable level of functioning. To overcome this limitation in future research, it would be of benefit to the field to establish a functioning threshold for thriving that could be applied across studies (cf. Kendall, Hollon, Beck, Hammen, & Ingram, 1987). Relatedly, the results of the present study highlighted that the extent to which a sport performer is self-critical might impact their subjective performance and well-being, with some performers therefore having a greater propensity to be classified as thriving compared to others. Future research may consider controlling for the effect of this perfectionistic tendency (cf. Hewitt & Flett, 1991), or exploring the use of personal normative scores for functioning and researcher observations, to support the identification of thriving match experiences.

To conclude, the present study employed mixed methods to provide an original and pertinent insight into sport performers' match experiences. More specifically, the study compared the experiences of thriving and non-thriving hockey players, and identified codes and relationships encapsulated in their experiences prior to, during, and following a significant sporting encounter. Therefore, the findings from this study offer a comprehensive exploration of the distinguishing features of thriving and non-thriving performers' match experiences, and offer coaches and practitioners a multitude of avenues for facilitating thriving in athletes.

6.6 Reference List

- Benson, A. J., Evans, M. B., & Eys, M. A. (2016). Organizational socialization in team sport environments. *Scandinavian Journal of Medicine & Science in Sports*, 26, 463-473. doi:10.1111/sms.12460
- Bernard, H., & Ryan, G. (2010). *Analyzing qualitative data: Systematic approaches*. Thousand Oaks, CA: Sage Publications.
- Boat, R., & Taylor, I. M. (2015). Patterns of change in psychological variables leading up to competition in superior versus inferior performers. *Journal of Sport & Exercise Psychology*, 37, 244-256. doi:10.1123/jsep.2014-0216
- Brown, D. J., Arnold, R., Fletcher, D., & Standage, M. (in press). Human thriving: A conceptual debate and literature review. *European Psychologist*.
- Brown, D. J., Arnold, R., Reid, T., & Roberts, G. (2017). *A qualitative inquiry of thriving in elite sport*. Manuscript submitted for publication.
- Brown, D. J., Arnold, R., Standage, M., & Fletcher, D. (2017a). *One-off or serial thrivers? A latent class growth analysis of sport performers' responses to competitive sporting encounters over time*. Manuscript in preparation.
- Brown, D. J., Arnold, R., Standage, M., & Fletcher, D. (2017b). *Thriving on pressure: A factor mixture analysis of sport performers' responses to competitive sporting encounters*. Manuscript submitted for publication.
- Brown, D. J., Arnold, R., Standage, M., Turner, J. E., & Fletcher, D. (2017). *The prediction of thriving in elite athletes: An exploration of potential process variables and biomarkers*. Manuscript in preparation.
- Cooper, C. L., & Cartwright, S. (1997). Workplace: An intervention strategy for workplace stress. *Journal of Psychosomatic Research*, 43, 7-16. doi:10.1016/S0022-3999(96)00392-3
- Creswell, J. W., & Plano Clark, V. L. (2011). *Designing and conducting mixed methods research* (2nd ed.). Thousand Oaks, CA: Sage Publications.
- Debois, N., Ledon, A., & Wylleman, P. (2015). A lifespan perspective on the dual career of elite male athletes. *Psychology of Sport and Exercise*, 21, 15-26. doi:10.1016/j.psychsport.2014.07.011
- Freeman, P., & Rees, T. (2010). Perceived social support from team-mates: Direct and stress-buffering effects on self-confidence. *European Journal of Sport Science*, 10, 59-67. doi:10.1080/17461390903049998

- Galli, N., & Reel, J. J. (2012). 'It was hard, but it was good': A qualitative exploration of stress-related growth in Division I intercollegiate athletes. *Qualitative Research in Sport, Exercise and Health*, 4, 297-319. doi:10.1080/2159676X.2012.693524
- Giacobbi, P. R., Jr., Poczwadowski, A., & Hager, P. (2005). A pragmatic research philosophy for applied sport psychology. *The Sport Psychologist*, 19, 18-31.
- Gucciardi, D. F., Jackson, B., Hodge, K., Anthony, D. R., & Brooke, L. E. (2015). Implicit theories of mental toughness: Relations with cognitive, motivational, and behavioral correlates. *Sport, Exercise, and Performance Psychology*, 4, 100-112. doi:10.1037/spy0000024
- Guest, G., MacQueen, K. M., & Namey, E. E. (2012). *Applied thematic analysis*. Thousand Oaks, CA: Sage Publications.
- Guest, G., Shattuck, D., Johnson, L., Akumatey, B., Kekawo Clarke, E. E., Chen, P.-L., & MacQueen, K. M. (2008). Changes in sexual risk behavior among participants in a PrEP HIV prevention trial. *Sexually Transmitted Diseases*, 35, 1002-1008. doi:10.1097/OLQ.0b013e3181812939
- Hassell, K., Sabiston, C. M., & Bloom, G. A. (2010). Exploring the multiple dimensions of social support among elite female adolescent swimmers. *International Journal of Sport Psychology*, 41, 340-359.
- Hewitt, P. L., & Flett, G. L. (1991). Perfectionism in the self and social contexts: Conceptualization, assessment, and association with psychopathology. *Journal of Personality and Social Psychology*, 60, 456-470. doi:10.1037/0022-3514.60.3.456
- Hutchinson, S., & Wilson, H. S. (1992). Validity threats in scheduled semistructured research interviews. *Nursing Research*, 41, 117-119. doi:10.1097/00006199-199203000-00012
- Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed methods research: A research paradigm whose time has come. *Educational Researcher*, 33, 14-26. doi:10.3102/0013189x033007014
- Kendall, P. C., Hollon, S. D., Beck, A. T., Hammen, C. L., & Ingram, R. E. (1987). Issues and recommendations regarding use of the Beck Depression Inventory. *Cognitive Therapy and Research*, 11, 289-200. doi:10.1007/bf01186280
- King, P. E., Dowling, E. M., Mueller, R. A., White, K., Schultz, W., Osborn, P., . . . Scales, P. C. (2005). Thriving in adolescence: The voices of youth-serving

- practitioners, parents, and early and late adolescents. *Journal of Early Adolescence*, 25, 94-112. doi:10.1177/0272431604272459
- Kvale, S., & Brinkmann, S. (2008). *Interviews: Learning the craft of qualitative research* (2nd ed.). Thousand Oaks, CA: Sage Publications.
- Liu, J., & Bern-Klug, M. (2013). Nursing home social services directors who report thriving at work. *Journal of Gerontological Social Work*, 56, 127-145. doi:10.1080/01634372.2012.750255
- Mallett, C. J., & Hanrahan, S. J. (2004). Elite athletes: Why does the 'fire' burn so brightly? *Psychology of Sport and Exercise*, 5, 183-200. doi:10.1016/s1469-0292(02)00043-2
- Meuleman, A.-M., Garrett, R., Wrench, A., & King, S. (2015). 'Some people might say I'm thriving but ...': Non-traditional students' experiences of university. *International Journal of Inclusive Education*, 19, 503-517. doi:10.1080/13603116.2014.945973
- Miles, A. J., Neil, R., & Barker, J. (2016). Preparing to take the field: A temporal exploration of stress, emotion, and coping in elite cricket. *The Sport Psychologist*, 30, 101-112. doi:10.1123/tsp.2014-0142
- Moran, A. P., Matthews, J. J., & Kirby, K. (2011). Whatever happened to the third paradigm? Exploring mixed methods research designs in sport and exercise psychology. *Qualitative Research in Sport, Exercise and Health*, 3, 362-369. doi:10.1080/2159676X.2011.607843
- Morris, R., Tod, D., & Eubank, M. (2016). From youth team to first team: An investigation into the transition experiences of young professional athletes in soccer. *International Journal of Sport and Exercise Psychology*, 1-17. doi:10.1080/1612197X.2016.1152992
- Patton, M. Q. (1990). *Qualitative evaluation and research methods* (2nd ed.). Newbury Park, CA: Sage Publications.
- Poczwardowski, A., Diehl, B., O'Neil, A., Cote, T., & Haberl, P. (2014). Successful transitions to the Olympic Training Center, Colorado Springs: A mixed-method exploration with six resident-athletes. *Journal of Applied Sport Psychology*, 26, 33-51. doi:10.1080/10413200.2013.773950
- Porath, C., Spreitzer, G., Gibson, C., & Garnett, F. G. (2012). Thriving at work: Toward its measurement, construct validation, and theoretical refinement. *Journal of Organizational Behavior*, 33, 250-275. doi:10.1002/Job.756

- Porta, M. (Ed.). (2014). *A dictionary of epidemiology* (6th ed.). New York, NY: Oxford University Press.
- Salim, J., Wadey, R., & Diss, C. (2016). Examining hardiness, coping and stress-related growth following sport injury. *Journal of Applied Sport Psychology*, 28, 154-169. doi:10.1080/10413200.2015.1086448
- Sanders, P., & Winter, S. (2016). Going pro: Exploring adult triathletes' transitions into elite sport. *Sport, Exercise, and Performance Psychology*, 5, 193-205. doi:10.1037/spy0000058
- Sarkar, M., & Fletcher, D. (2014). Ordinary magic, extraordinary performance: Psychological resilience and thriving in high achievers. *Sport, Exercise, and Performance Psychology*, 3, 46-60. doi:10.1037/spy0000003
- Spreitzer, G., Sutcliffe, K., Dutton, J., Sonenshein, S., & Grant, A. M. (2005). A socially embedded model of thriving at work. *Organization Science*, 16, 537-549. doi:10.1287/orsc.1050.0153
- Sumsion, J. (2004). Early childhood teachers' constructions of their resilience and thriving: A continuing investigation. *International Journal of Early Years Education*, 12, 275-290. doi:10.1080/0966976042000268735
- Swann, C., Keegan, R., Crust, L., & Piggott, D. (2016). Psychological states underlying excellent performance in professional golfers: "Letting it happen" vs. "making it happen". *Psychology of Sport and Exercise*, 23, 101-113. doi:10.1016/j.psychsport.2015.10.008
- Tamminen, K. A., Holt, N. L., & Neely, K. C. (2013). Exploring adversity and the potential for growth among elite female athletes. *Psychology of Sport and Exercise*, 14, 28-36. doi:10.1016/j.psychsport.2012.07.002
- UK Sport. (2015). How UK Sport funding works. Retrieved from <https://www.uksport.gov.uk/our-work/investing-in-sport/how-uk-sport-funding-works>
- Williams, S. E., Cumming, J., & Balanos, G. M. (2010). The use of imagery to manipulate challenge and threat appraisal states in athletes. *Journal of Sport & Exercise Psychology*, 32, 339-358.
- Wolf, S. A., Eys, M. A., Sadler, P., & Kleinert, J. (2015). Appraisal in a team context: Perceptions of cohesion predict competition importance and prospects for coping. *Journal of Sport & Exercise Psychology*, 37, 489-499.

Closing Commentary

The findings presented in this Chapter demonstrate the complexity inherent in sport performers' match experiences and highlight the difficulties researchers face when attempting to explain them. However, they also place elements of players' performances (e.g., skill execution, personal contribution), enjoyment levels, and levels of satisfaction (with their performance and match) at the heart of these experiences and, therefore, provide support for these features being noteworthy targets for assessment in future thriving research (cf. Chapters 2 and 3). Furthermore, although the participants did not explicitly discuss basic psychological needs (BPN) or stress appraisals, aspects of their pre-match and in-match feelings did capture components BPN (e.g., feeling confident in one's abilities) and relationships between codes included evaluations that would be influential in stress appraisals (e.g., evaluations of familiarity). These findings, therefore, offer some support to findings presented in Chapters 3, 4 and 5. Lastly, the numerous relationships identified between codes reinforce the need for future research to extend analyses beyond single variables and to consider multifaceted interactions (cf. Chapter 5), as well as providing practitioners with a variety of options for facilitating thriving.

Chapter 7. General Discussion and Conclusions

7.1 Overview

Sport performers are exposed to a wide variety of stressors during their athletic careers, and a substantial body of literature exists that has identified and categorized these demands (see, e.g., Arnold & Fletcher, 2012; Fletcher, Hanton, & Mellalieu, 2006; Sarkar & Fletcher, 2014b). Furthermore, researchers have examined how athletes respond to the stressors and attempted to explain why these responses arise (see, e.g., Gaudreau, Nicholls, & Levy, 2010; Jones, 1995). What has been absent from the extant literature, however, is a systematic investigation of the most adaptive of these responses – thriving. This thesis was designed to address this gap within the literature through the proposal of a robust conceptualization of thriving and the reporting of four interrelated studies. Within these studies, cross-sectional, longitudinal, and mixed methods were used to examine and compare thriving and non-thriving sport performers' match experiences. Specifically, Study 1 (see Chapter 3) investigated sport performers' responses to competitive encounters with an aim of establishing whether distinct response patterns existed between sport performers who thrived and those who did not. Study 2 (see Chapter 4) extended the assessment of thriving to encompass multiple sporting encounters and explored whether changes in functioning coincided with fluctuations in performers' perceptions of basic psychological needs satisfaction (BPNS) and frustration (BPNF). In Study 3 (see Chapter 5), the predictive relationships of BPNS and challenge appraisal on thriving were examined using a diary study design. In addition, Study 3 investigated whether salivary biomarkers of thriving could be established. In Study 4 (see Chapter 6) quantitative assessments of sport performers' in-match functioning were used to identify individuals who thrived and those who did not. Interviews were then conducted with these performers to explore and compare their match experiences.

7.2 Summary of Findings and Contribution of the Thesis

Within this section, findings across studies are combined and integrated to highlight the contribution of the overall thesis to knowledge, research, and theory. The narrative is separated into four sections: Conceptualization and Assessment of

Thriving, Thriving Over Time, Physical Thriving, and Influential Variables of Thriving in Sport Performers.

7.2.1 Conceptualization and Assessment of Thriving

At the beginning of this thesis it was noted that, although athletes and teams are often described by media as ‘thriving’, explicit research on the construct in sport performers was scarce. Thus, a preliminary objective for this thesis was to establish a conceptual foundation upon which to base subsequent investigations of thriving in sport. In order to provide this grounding, within Chapter 2, previous definitions and conceptualizations of thriving were collated and reviewed (viz. Benson & Scales, 2009; Bundick et al., 2010; Lerner, Dowling, & Anderson, 2003; O’Leary & Ickovics, 1995; Park, 1998; Sarkar & Fletcher, 2014a; Spreitzer et al., 2005; Su, Tay, & Diener, 2014; Walker & Grobe, 1999). From this synthesis, it was apparent that much confusion exists between scholars, which was suggested to have resulted from temporal and contextual variance in the construct (see Section 2.3.1). To elaborate, temporal variance has resulted in different thriving indicators being forwarded for youth and adult populations (see, e.g., Benson & Saito, 2001), making it difficult to integrate previous work and to establish a coherent definition to accurately reflect the construct across samples. In terms of contextual variance, researchers investigating the construct within developmental domains have typically perceived thriving to be a growth oriented process (see, e.g., Benson & Scales, 2009), whereas those researching thriving in performance domains have considered it to be a state (see, e.g., Spreitzer et al., 2005). Unsurprisingly, these divergent meanings of thriving have resulted in much ambiguity within the literature and a lack of conceptual consensus to guide scientific inquiry. To address this limitation and in an attempt to consolidate the previous literature, it was proposed that thriving should be considered as *the joint experience of development and success*. Furthermore, it was suggested that achieving both development and success relied on an individual experiencing holistic functioning, which could be determined through indices of well-being and performance. Following the presentation of this conceptualization in Section 2.3.1, additional justification was provided detailing why both experiencing a high-level of well-being and perceiving a high-level of performance is required, and how this definition of thriving differentiates the construct from other terms referred to by scholars that may appear similar, yet have fundamental differences.

To examine the applicability and utility of this conceptualization within sport (cf. Section 2.5), it was necessary to investigate whether it could be used to differentiate between sport performers who thrived and those who did not. Within Chapter 3, sport performers' in-match functioning was assessed, in accordance with the definition, via indices of subjective performance and well-being. Specifically, sport performers were asked to report their perceived levels of performance satisfaction, subjective vitality, and positive affect experienced in sporting encounters; these variables were then modelled as indicators of a latent functioning construct. The structure of this model was supported by a second-order confirmatory factor analysis (see Section 3.3.3.1). This represents the first time that functioning has been modelled in this way with previous sport and thriving research tending to examine performance and well-being as separate outcome variables (see, e.g., Carpentier & Mageau, 2013; Porath, Spreitzer, Gibson, & Garnett, 2012). This approach therefore captures the multifaceted nature of thriving (cf. Su et al., 2014) and offers a novel option for assessing human functioning holistically in future research. In the next stage of the analysis, factor mixture analysis was used to investigate whether the performance and well-being indicator variables underpinned unmeasured profile membership. That is, whether the three variables could be used to identify distinct response patterns between sport performers who thrived in competitive encounters compared to those who did not. The results supported a four-profile solution comprising a high-functioning 'thriving' group, an above average functioning group, a below average functioning group, and a low functioning group (see Sections 3.4.1 and 3.4.2). Thus, this finding provides initial evidence to support the definition proposed in Chapter 2 and demonstrates that assessments couched in this conceptual approach can be used to identify sport performers who thrive. Furthermore, this findings adds greater depth to the existing methods used for assessing thriving (see, e.g., Porath et al., 2012), by suggesting that a broader continuum of functioning responses exists with thriving appearing at the top of this scale.

Further validation for the utility of considering subjective performance and well-being when evaluating sport performers' match functioning was provided by the qualitative accounts reported in the study presented in Chapter 6. To elaborate, when discussing their experience of an important competitive encounter, thriving and non-thriving performers centred their reflections on performance-related (e.g.,

targeted playing standards, personal performance/skill execution, performance satisfaction/dissatisfaction) and well-being-related (e.g., pre-match feeling, enjoyment levels, fatigue) codes, and the relationships involving these codes (see Section 6.4). The prominence of performance and well-being in the collated accounts suggests that they are key features in sport performers' match experiences and are, therefore, important components to consider when exploring and investigating the factors that may determine whether or not an individual thrives.

Collectively, the findings reported across these chapters provide important advancements in the thriving literature. Namely, they have presented a conceptualization of thriving that attempts to offer a more ubiquitous and robust approach to encapsulate the construct than those currently available (see, e.g., Benson & Scales, 2009; Spreitzer et al., 2005). Furthermore, the utility of this conceptualization has been empirically tested with sport performers supporting both the construct's pertinence in this population and the use of performance and well-being as proxies for its assessment. Notwithstanding the contribution of this thesis to current understanding of what thriving represents, it is important to note that further steps are still required to refine this measurement of thriving (see Section 7.4.1 below).

7.2.2 Thriving Over Time

One of the questions that has been raised in the extant thriving literature (cf. Benson & Scales, 2009; Sarkar & Fletcher, 2014a), and which was reiterated in Section 2.5, was whether a cumulative effect of thriving exists. To answer this question, the study presented in Chapter 4 examined sport performers' functioning over a series of matches. Latent class growth analysis revealed three trajectory classes (viz. *High to Low Functioning*, *Above Average Stable Functioning*, *Low Stable Functioning*; see Section 4.4.2.1). These trajectories, and the proportion of individuals included within each class, suggest that it is more achievable for performers to sustain an above average level of functioning, than it is for them to continually thrive in competition. Furthermore, with over 97% of participants displaying stable levels of functioning, it appears that performers are more likely to maintain their functioning level, rather than increase or decrease it over time. In response to the query surrounding the lasting effect of thriving, therefore, the results from this first longitudinal assessment of sport performers' functioning suggest that thriving may not have a cumulative effect.

7.2.3 Physical Thriving

The predominant focus for the research reported in this thesis has been the psychological nature of thriving (i.e., the experience of well-being and the perception of performance); however, in an extension of this work, an investigation was also conducted into physical thriving (see Chapter 5). This study was grounded in Epel, McEwen, and Ickovics' (1998) suggestion that thriving could be investigated through an individual's hormonal responses to a stressful situation, and involved an exploration of whether salivary biomarkers of thriving could be established. Specifically, sport performers completed a saliva sampling protocol on the day of an important sporting encounter and samples were assayed for cortisol and dehydroepiandrosterone (DHEA). Using these measured concentrations, the relationships between cortisol reactivity, anabolic balance (i.e., the ratio between anabolic DHEA and catabolic cortisol), and functioning were assessed. The results revealed no significant associations and, therefore, challenged the assertion that salivary biomarkers of thriving exist. Whilst recognizing that this analysis was limited by the small sample used, the findings do raise interesting questions about the validity of extending previous laboratory results on thriving to real-life situations. Furthermore, it highlights the challenges of measuring sport performers' hormone responses to stress and of using these measurements to predict their in-game functioning.

7.2.4 Influential Variables of Thriving in Sport Performers

Turning from the nature of thriving to its relationship with pertinent variables, the studies included in this thesis examined and compared the levels of perceived enabler and process variables in thriving and non-thriving sport performers. This investigation began with the consolidation of variables previously found to be associated with the construct (see Section 2.4). More specifically, using evidence collated from studies conducted across the human lifespan and a variety of contexts and domains, factors were categorized into personal enablers (e.g., psychological resilience), contextual enablers (e.g., family support), and process variables (e.g., BPNS). Although the intention of this synthesis was to provide readers with a brief, narrative review of these variables, this section also provides the most inclusive review of these factors to date. To elaborate, previous summaries such as that reported by Bundick and colleagues (2010), were published prior to the recent increase in literature examining thriving in adult populations (see, e.g.,

Beltman, Mansfield, & Price, 2011; Porath et al., 2012; Sarkar & Fletcher, 2014a), and therefore tend to offer more detailed accounts on youth and adolescent thriving.

Next, a number of these factors were considered within a sporting context (see Chapter 3). Specifically, the perceived levels of five possible enablers (viz. resilient qualities, psychological skills use, coach needs supportive behaviours, coach needs thwarting behaviours, social support) and four possible process variables (viz. BPNS, BPNF, challenge appraisal, threat appraisal) were considered as predictors for the likelihood of membership to a thriving profile. The results showed profile membership was predicted by higher levels of personal enablers (viz., resilient qualities, psychological skills use) and process variables (viz. BPNS). Thus, these findings supported the associations reported in Section 2.4 and provided the first evidence to suggest that the enabler and process variables are related to functioning (i.e., as indexed by a combined performance and well-being score) and, ultimately, thriving in sport performers. By finding associations to exist between the enabler variables and functioning, these results extend previous literatures that have espoused relationships between the variables and performance (see, e.g., Galli & Gonzalez, 2015; Mahoney, Gabriel, & Perkins, 1987) and well-being (see, e.g., Edwards & Edwards, 2012) separately. Similarly, identifying associations between the process variables and functioning supports previous research linking basic psychological needs to performance and well-being in sport (see, e.g., Bartholomew, Ntoumanis, Ryan, Bosch, & Thøgersen-Ntoumani, 2011; Kipp & Weiss, 2013; Reinboth, Duda, & Ntoumanis, 2004).

The study reported in Chapter 4 extended these initial exploratory findings by examining the relationships between BPNS, BPNF, and functioning over time. Based on Deci and Ryan's (2000) basic needs theory and previous research conducted on thriving at work (see, for a review, Spreitzer & Porath, 2014), it was predicted that trajectory groups identified for sport performers' functioning would be related to those identified for BPNS and BPNF. The results revealed a clear relationship between performers with average and low levels of BPNS and functioning, but the association between high levels of BPNS and functioning was less robust (see Section 4.4.2.4). Furthermore, the expected inverse patterns were identified between levels of BPNF and functioning when BPNF was high or at an average level; however, when BPNF was low, participants were found to reside in the "*Above Average Stable Functioning*" group rather than the anticipated "*High to*

Low Functioning” group. These findings, therefore, provide the first evidence to support the relationship between basic psychological needs and athletes’ levels of functioning (as indexed by a combined performance and well-being score) over time, and are in accordance with the propositions of basic needs theory (Deci & Ryan, 2000); that is, that BPNS and BPNF are associated with performance and wellness (see, also, Cerasoli, Nicklin, & Nassreelrgawi, 2016; Deci & Vansteenkiste, 2004). However, they also suggest that perceiving low BPNF is not necessary for thriving, and that, in isolation, high BPNS is not sufficient for establishing high-level functioning over time. Thus, whilst BPNS may still be considered vital for optimal functioning (cf. Sheldon, 2009), other variables need to be considered when attempting to understand this experience.

This consideration informed the design of the study reported in Chapter 5, with challenge appraisal assessed alongside BPNS. To elaborate, within Study 3, participants were asked to complete a diary survey for BPNS and challenge appraisal on seven consecutive days prior to an important sporting encounter. In-game functioning was then assessed using indices of performance and well-being following the match. On this occasion, pre-game levels of BPNS were found to positively predict functioning; with a positive relationship also found for challenge appraisal (see Section 5.4.2). These findings therefore provide further support the relationship between BPNS and functioning (Deci & Ryan, 2000; Ryan & Deci, 2000; 2008; see also, Chapters 3 and 4). The identification of a positive relationship between challenge appraisal and functioning aligns with the ideas espoused in the transactional model of stress and coping (cf. Lazarus, 1966; Lazarus & Folkman, 1984). Within this model, Lazarus and Folkman (1984) suggest that, when faced with a situational demand, humans make three types of stressful appraisal (i.e., expectations of harm/loss, threat, or challenge). Of these three evaluations, challenge appraisals are considered the most adaptive, since they represent a judgment of the potential for gain or growth. Previous research has found challenge appraisals to be positively associated with adaptive forms of coping and desirable outcomes (see, e.g., Ohly & Fritz, 2010; Searle & Auton, 2014; Skinner & Brewer, 2004); however, the study presented in Chapter 5 is the first to establish a predictive relationship between challenge appraisal and functioning (as indexed by a combined performance and well-being score).

To elicit a greater awareness of what other factors may be pertinent to

thriving in sport, Study 4 reports findings from an analysis of interviews conducted with thriving and non-thriving individuals following a sporting encounter. Within this analysis, 52 codes and 148 relationships between codes pertinent to players' match experiences were revealed (see Section 6.4). Although the majority of codes emerging were similar across the two groups, 17 were unique to one of the two groups and, where codes did co-occur, substantial differences existed in the expression of these codes and in the relationships between them. For example, the *injury* code used in the thriving group was expressed in relation to a pre-existing or recently healed injury, whereas, when used in the non-thriving group, it was associated with an in-match injury. As a further example, the expression of the *returning to squad* code in the thriving group encapsulated positive connotations (e.g., excitement); in contrast, this code evoked anxiety and worry in the non-thriving group. It was suggested, therefore, that the differing expression of the codes may offer potential explanations for the varied match experiences observed. Additionally, the numerous relationships identified between codes were proposed to reinforce the need for future research to extend analyses beyond single variables and to consider multifaceted interactions.

In summary, the findings presented in this thesis have identified a wide variety of variables that appear to impact thriving in sport performers. In support of the extant literature consolidated and reviewed in Chapter 2, study 1 (see Chapter 3) found evidence to suggest that resilient qualities (cf. Jackson, Firtko, & Edenborough, 2007) were predicted thriving in athletes. In addition, the use of psychological skills was evaluated as a potential personal enabler of thriving in sport performers due to its pertinence within the extant sporting literature (see, e.g., Edwards & Edwards, 2012; Mahoney et al., 1987). Across the studies reported in Chapters 3-5, the role of basic psychological needs in sport performers' in-match functioning was systematically investigated, with results found to support a relationship between BPNS and thriving (cf. Sheldon, 2009; Spreitzer & Porath, 2014). However, these results also suggested that other variables, such as challenge appraisal, are important to consider (see Chapter 5). Finally, study 4 demonstrated the complexity inherent in sport performers' match experiences and identified many of the broader factors (e.g., level of self-criticality) that researchers need to be aware of when attempting to explain thriving.

7.3 Applied Implications

The findings presented in this thesis have a variety of possible implications for athletes, coaches, and practitioners wanting to facilitate thriving in sport performers. Broadly, the results suggest that those looking to enhance thriving should focus on the development of personal enablers, and the mechanisms through which these impact thriving. These mechanisms may include direct and indirect effects, with the latter observed through the elicitation of challenge appraisals and the fostering of performers' perceptions of autonomy, competence, and relatedness. Appraising a situation as having the potential for gain and growth is contingent on the individual's perceptions of demands to be overcome, and his or her resources for doing this (Lazarus & Folkman, 1984). Thus, to evoke a challenge appraisal, practitioners could work to increase the resources perceived by the performer or look to decrease the demands experienced. Such strategies may include developing his or her personal and contextual enablers (e.g., resilient qualities; Reivich, Seligman, & McBride, 2011), removing or alleviating unnecessary stressors through primary stress management interventions (see, e.g., Cooper & Cartwright, 1997), or teaching the athlete to reappraise the situation as less threatening (see, e.g., Moore, Vine, Wilson, & Freeman, 2015). Turning to the creation of autonomy, competence, and relatedness satisfaction, coaches and practitioners could look to create needs supportive environments through the manifestation of contextual enablers (cf. Deci & Ryan, 2000; Reinboth et al., 2004). Grounded in the results from the studies included in this thesis, the following sections discuss a number of these strategies in further detail. It should be noted at this juncture, however, that the suggestions which follow are only suggestive and should be considered carefully given research on thriving in sport remains in its infancy.

7.3.1 Development of Personal and Contextual Enablers

Within Section 2.4, examples of personal and contextual enablers of thriving previously identified within the extant literature were described. Personal enablers (e.g., positive perspective, proactive personality) were considered to comprise the attitudes, cognitions, and behaviours of an individual that help him or her to thrive (cf. Park, 1998), and contextual enablers (e.g., challenge environment, family support) were described as the characteristics of the environment that could foster continued task engagement and subsequent thriving (cf. Carver, 1998). The

existence of these variables can, therefore, directly impact thriving, or can act indirectly via increasing performers' perceptions of resources (i.e., increasing the likelihood of a challenge appraisal) and needs satisfaction. The first method for facilitating thriving, therefore, is to develop these variables within the individual and to support their manifestation in the surrounding environment.

In relation to sport performers, personal resilient qualities and use of psychological skills were found to predict the likelihood of membership to a thriving profile (see Chapter 3). Personal resilient qualities (viz. autonomous values and beliefs, proactive personality, and robust confidence) encapsulate the protective factors that can modify, ameliorate, or alter a person's response to an occurrence that will likely have a maladaptive outcome (cf. Rutter, 1985; Sarkar & Fletcher, 2014b). Programmes aiming to establish these characteristics in humans have previously been devised for military populations (see, e.g., Jarrett, 2013; Reivich et al., 2011); however, recent attempts have also been made to extend this application to sportsmen and women (see, Fletcher & Sarkar, 2016). For example, Gonzalez, Detling, and Galli (2016) reported on their attempts to establish resilience in elite athletes following the principles of a resilience framework. Accordingly, the practitioners looked to establish robust protective factors (e.g., strong team or group structure; Morgan, Fletcher, & Sarkar, 2013), prior to supporting the manifestation of resilient qualities and behaviours. Following these and other programmes previously designed to develop resilience, practitioners may be able to enhance the personal resilient qualities held by an athlete to help them cope with the demands they experience, and, ultimately, thrive.

Psychological skills are the cognitive-affective techniques and process used by an individual to enhance and optimize his or her functioning (cf. Hardy, Roberts, Thomas, & Murphy, 2010; Thomas, Murphy, & Hardy, 1999). Examples of such skills include arousal regulation, imagery, goal setting, and attention or concentration, and these qualities can be developed through a variety of psychological methods (e.g., breathing techniques) and taught within a programme of psychological skills training (Vealey, 1988). With increased use of psychological skills found to be associated with thriving (see Chapter 3), it may be of benefit for practitioners looking to facilitate this experience to consider and enhance the psychological techniques currently used by their athletes. In support of this approach, practitioners may look to draw on the principles of performance profiling

(see, Butler & Hardy, 1992) whereby athletes identify areas of strength and weakness, and select the components to be developed. Performance profiling has previously been recommended as it provides athletes with self-determination over the programme, that will likely increase their motivation to engage in the training (Jones, 1993). However, it is also important that practitioners are aware of the challenges faced when using this approach (e.g., lack of athlete understanding and ability to make realistic assessments; Weston, Greenlees, & Thelwell, 2013).

Results on the role of contextual enablers on thriving were mixed across the studies, with social support and coach behaviours found to be non-significant predictors of the likelihood of thriving profile membership in Chapter 3, but with these social agents described as being important by participants in Chapter 6. Within this latter chapter, codes and relationships from a qualitative inquiry are presented and highlight specific examples of how teammates and coaches provided support to participants (e.g., through their interactions), and how these experiences differed between the thriving and non-thriving groups. Although disparity often exists between the perception of available support and the perception of support received (see, e.g., Goodwin, Costa, & Adonu, 2004), this discontinuity offers practitioners two avenues for facilitating thriving using social support. First, sport psychologists could attempt to increase performers' awareness of the potential sources (e.g., teammate, coach, sport psychology practitioner, family, external organizations) and prevalence of support, as this would alter their subsequent stress appraisals (Freeman & Rees, 2009). Second, practitioners could devise and develop interventions to increase the amount and quality of support received by the performers, by developing interventions to enhance support offered by teammates (see, e.g., Rosenfeld & Richman, 1997), coaches (see, e.g., Smoll, Smith, Barnett, & Everett, 1993), and the practitioner him- or herself (see, e.g., Freeman, Rees, & Hardy, 2009). For example, coaches could look to support athletes' perception of autonomy by giving choice within specific rules and limits (see, for a review, Mageau & Vallerand, 2003). Furthermore, perceptions of competence and relatedness could be enhanced by coaches avoiding the use of criticism and acknowledging the athletes' feelings, respectively (Bartholomew, Ntoumanis, & Thøgersen-Ntoumani, 2009; Mageau & Vallerand, 2003). Practitioners may also look to glean insight from research conducted in other performance domains. To illustrate, Spreitzer, Porath, and Gibson (2012) detail a variety of strategies (e.g., providing decision-making

discretion) for fostering needs satisfaction in the work environment, that may be applicable for coaches and practitioners working with athletes.

7.3.2 Removing or Alleviating Unnecessary Stressors

The demands and pressures experienced by sport performers have been discussed widely within the academic literature (Arnold & Fletcher, 2012; Fletcher et al., 2006; Sarkar & Fletcher, 2014b). Indeed, the manifestation of many of these stressors is unavoidable in sporting contexts (e.g., competition pressure, injury, selection) and athletes must learn to cope with them in order to thrive (cf. Sarkar & Fletcher, 2014a). However, within the study presented in Chapter 6, participants identified a number of maladaptive stressors (e.g., travelling, workload) that may be deemed unnecessary or easily remedied. It is plausible that the presence of these additional demands impacted performers appraisal of the match (i.e., reduced the likelihood of perceiving it as a challenge) and, thus, precluded thriving. Practitioners and coaches could work with athletes to identify these demands, and look to facilitate thriving through their removal or alleviation (cf. Cooper & Cartwright, 1997). Such primary stress management interventions may help to rebalance the demands-resources evaluation underpinning athletes' stress appraisals (Lazarus & Folkman, 1984), and foster the necessary task engagement for thriving (cf. Carver, 1998).

7.3.3 Utilizing Previous Thriving Experiences

A further approach for facilitating thriving would be to harvest the positive effects of previous thriving experiences. Although the results presented in Chapter 4 suggest that thriving did not have a cumulative effect, thriving in sport encounters has previously been shown to elicit increases in confidence and to provide performers with a positive source for future reference (see Section 6.4; see also, Brown et al., 2017). To ensure that the positive outcomes do create a lasting effect of thriving, practitioners and coaches could attempt to consolidate these perceptions so that they become established as personal enablers (e.g., positive perspective) for performers to draw upon in future encounters. In support of this suggestion, practitioners may explore the role of interpersonal relationships acting as catalysts for turning a positive opportunity into long-term thriving (cf. Feeney & Collins, 2015). More specifically, coaches could look to solidify performers' perceptions of increased confidence through verbal reinforcement (see, e.g., Jones & Spooner,

2006) and elicit greatest learning from an encounter using post-match questioning (see, e.g., Mesagno, Hill, & Larkin, 2015).

7.4 Future Research Directions

With the strengths and limitations pertinent to each of the studies detailed within their respective Chapters, the purpose of this section of the General Discussion is to offer a critical judgment of the thesis, to identify where gaps remain in the literature, and to propose how these could be addressed in future research. Specifically, this section will consider the measurement of thriving, establishing a distinction between thriving and competing constructs, the analytical lens used to investigate thriving, variables and relationships, and the evaluation of an intervention to facilitate thriving.

7.4.1 Measurement of Thriving

Within this thesis, a novel conceptualization of thriving was forwarded (see Section 2.3.1) and an innovative approach for assessing thriving was examined (see Chapter 3). Specifically, thriving was considered to be a high-level of holistic functioning, determined using proxy indicators of subjective performance and well-being. This method was found to be effective for identifying individuals who thrived within athletic samples. However, as noted in Section 6.5, no functioning thresholds for thriving currently exist, which may result in individuals being classified as thriving in one sample, but not in another. This is particularly problematic for between-persons analyses such as that conducted in Study 4, as misclassification of participants can result in individuals' responses being contrasted, rather than combined, with those from participants with arguably comparable levels of functioning. Establishing a standardized level of functioning above which thriving is believed to occur could prevent inconsistencies between studies. This approach is not without its limitations, however, as it may result in studies failing to identify any individuals who thrived, and the temporal and contextual variance in the construct (see Section 2.3.1; see also, Bundick et al., 2010) may make establishing a comparable threshold across samples and settings difficult.

The variance previously identified in thriving also has implications for the explicit measurement of the construct. Within the studies included in this thesis, items assessing subjective performance and well-being were contextualized to participants' sporting encounters. The well-being measures used (see Appendix

One) have previously been shown to be valid in a variety of contexts (e.g., sport, Carpentier & Mageau, 2013; health, Hunt et al., 2014; education, Reis, Sheldon, Gable, Roscoe, & Ryan, 2000; work, Venkataramani & Tangirala, 2010) and, indeed, the appropriateness of using vitality and positive affect to assess eudaimonic and hedonic well-being remains across settings. However, well-being may also include physical (Scheier & Carver, 1987) and social (Keyes, 1998) dimensions that may be pertinent to thriving and its assessment in different domains. For example, although aspects of physical well-being (e.g., fitness, absence of injury) may be encompassed in an assessment of subjective vitality in a sporting context (see Section 6.5), different elements of physical well-being (e.g., absence of illness) may require specific consideration in other populations (e.g., the elderly).

The assessment of performance may also require further consideration in future research. In Section 2.3.1 it was recognized that performance is determined by the level of quality shown in the execution of an action, operation, or process (cf. Simpson, Weiner, Murray, & Burchfield, 1989). The tasks on which these behaviours occur vary from one situation to another (e.g., gymnastics routine, school examination) and the assessment of performance may, therefore, need to be refined to capture the idiosyncratic nature of the scenarios. A future research direction would be to explore methods for determining subjective performance pertinent to each context. One approach may be to establish role-specific performance indicators and to ask participants to report performance satisfaction based on their level of achievement against these markers. This approach of including multiple indicators would also benefit the reliability of the performance assessment employed within this thesis, as currently only one indicator has been used (cf. Churchill, 1979). When designing this measure, researchers would need to be mindful of how and when the performance indicators would be identified, and by whom. For example, it may be necessary for these markers to be established a priori to a study commencing. Importantly, the creation of a domain-, or even, role-specific functioning measure would have implications for the generalizability of such a measure and the establishment of thresholds noted previously.

7.4.2 Distinguishing Thriving from Competing Constructs

Further consideration of the methods through which thriving is determined has important implications for providing greater conceptual clarity for thriving and competing constructs. An area requiring such clarity, is the distinction between

thriving, resilience, and growth following adversity (see Section 2.3.1). It was previously recognized that, following adversity, resilience has been considered to represent a maintenance of functioning (Bonanno, 2004), whereas thriving has been suggested to describe an elevated level of functioning (O'Leary & Ickovics, 1995). To offer empirical support to this suggestion, researchers could adopt an experimental design with participants' levels of functioning monitored before and after the introduction of an 'adversity' (see, e.g., Arnetz, Nevedal, Lumley, Backman, & Lublin, 2009; Bell, Hardy, & Beattie, 2013). Changes in functioning could be assessed using a simple pre-post assessment with two time-points (Tabachnick & Fidell, 2013), or more sophisticated piecewise or multiphase latent growth modelling techniques if data are collected over three or more time-points (Cudeck & Klebe, 2002; Curran, Obeidat, & Losardo, 2010). Participants whose functioning decreased would be described as succumbing to the adversity, those who were able to maintain a comparable level of functioning described as being resilient, and individuals who demonstrated elevated functioning would be labelled as thriving. Notwithstanding the utility of this method for differentiating between resilience and thriving following adversity, some scholars may argue that thriving in this context is akin to stress-related growth (Park, Cohen, & Murch, 1996) or posttraumatic growth (Tedeschi & Calhoun, 1996); with the type of growth contingent on the severity of the adversity (Park, 2004). One method that could be used to establish whether thriving and growth are distinct, or whether one of the terms is empirically redundant, would be to examine the construct-level relationships between the two terms after the removal of biases created by measurement error (see, e.g., Le, Schmidt, Harter, & Lauver, 2010). Should the constructs be correlated at 1.00 (or close to 1.00) and display comparable relationships to external variables (e.g., basic psychological need satisfaction), then it may be argued that the terms lack discriminant validity (Le et al., 2010) and, thus, are empirically indistinguishable. Conducting an examination of these relationships would be advantageous for future research, as it would ensure that the terms used in the literature are limited to those which have empirical and conceptual differences.

7.4.3 Analytical Lens Used to Investigate Thriving

The questionnaires employed in the studies included in this thesis asked performers to consider their experiences in sporting encounters over the past month (Study 1), in the past two weeks (Study 2), and those they had just completed

(Studies 3 and 4). In all of these studies, functioning in the encounter was captured in relation to the entire encounter (i.e., a match). However, the findings from Study 4 demonstrated that it was possible for performers to compartmentalize these encounters (e.g., first and second halves). More specifically, a number of the performers in the thriving group described a critical moment in the match that separated their experience into positive and negative sections. This finding suggests that it is also important to consider within-match fluctuations in performers' functioning alongside their global experience. It is acknowledged, however, that this suggestion is not without its methodological challenges and effective methods are yet to be devised that enable momentary assessments of performers' in-match perceptions.

Notwithstanding the interest and importance of considering how performers' functioning fluctuates within a match, it may also be important to consider the context surrounding the match and how this impacts thriving. Within Study 2, this context was extended to investigate thriving in a series of matches over time. Other situations that could be investigated in future research may include a competition (e.g., a World Cup) and a multi-sport competition (e.g., Olympic Games). Thriving within these settings will likely be impacted by a variety of additional factors not considered in the thriving literature to date (e.g., departing from normal routine, media distractions; presence of 'star' athletes; Greenleaf, Gould, & Dieffenbach, 2001; Orlick & Partington, 1988). Furthermore, these competitions often represent the pinnacle of sporting endeavour, making thriving within these contexts of even greater importance to performers and, thus, developing an understanding of thriving in these settings will have critical implications for practitioners, coaches, and sports organizations looking to facilitate it.

Beyond the individual's sporting life, an additional line of inquiry would consider thriving in performers' lives more broadly. To elaborate, the current approach to investigation has focused solely on sport performers' match experiences and has, therefore, failed to capture their levels of functioning outside of this scenario (e.g., in their family life), and whether thriving in one context impacts the other. Previous research (see, e.g., Brown et al., 2017), has suggested that thriving should be considered holistically and that individuals need to be happy in all areas of their lives to achieve positive development and success. Thus, it would be of benefit to the existing knowledge base if future research further explored this supposition, as

this may also have substantial implications for practitioners looking to facilitate thriving.

7.4.4 Variables and Relationships

Whilst process variables (i.e., BPNS, challenge appraisal) feature heavily within this thesis, it is important to recognize that other variables also play an important role in thriving and that future research extends investigations to these other factors. Indeed, this became particularly apparent in Study 4, where the complexity in sport performers' match experiences was elucidated. For example, one potential process variable that has received minimal coverage in extant thriving literature, but that may also be important for thriving on pressure, is an individual's perceived ability to cope with the demands he or she encounters (cf. Park, 1998). Influencing this perception will likely be the availability of enablers and any constraints that inhibit their use (e.g., a lack of institutional support, personal agendas; Folkman, 1992; Lazarus & Folkman, 1984). According to the transactional theory of stress and coping (Lazarus, 1966; Lazarus & Folkman, 1984), should an individual perceive that he or she could cope effectively with the scenario, then this may result in increased managing of demands, increased positive affect experienced, enhanced somatic health (i.e., physiological changes) and, ultimately, the likelihood of thriving.

Also of particular interest in future research will be the examination of relationships between enabler variables, process variables, and functioning. For example, understanding which enabler variables positively impact the BPNS and challenge appraisal process variables may be important for facilitating thriving (see Section 7.3). Building on the findings from this thesis and the theoretical ideas forwarded by the transactional theory of stress and coping (Lazarus, 1966; Lazarus & Folkman, 1984) and basic psychological needs theory (Deci & Ryan, 2000), Figure 7.1 illustrates a hypothesized structure for how these variables may interact to result in thriving within a competitive sporting encounter. According to the model, upon experiencing the performance situation, an individual who thrived will have appraised it as a challenge, which will then have enabled him or her to effectively cope with the demands, and, in turn, experience autonomy, competence, and relatedness, and achieve optimal functioning. Underpinning these process variables will be the individual's personal and contextual enablers, which can act in isolation or in combination. To investigate these relationships, investigations could use cross-

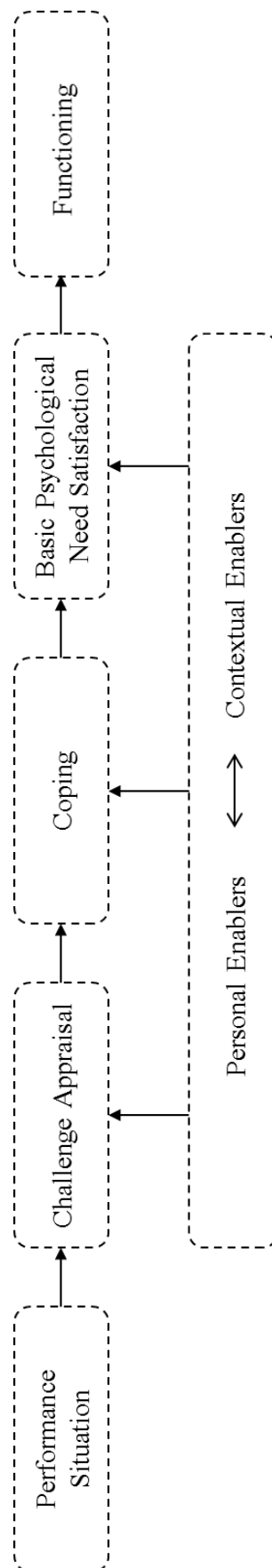


Figure 7.1 Hypothesized process model depicting how enabler and process variables may impact functioning and, ultimately, result in thriving

sectional methods to determine the strength of associations (see, e.g., Freeman & Rees, 2009) and longitudinal approaches to ascertain the temporal precedence of the two process variables currently identified (see, e.g., Gunnell, Bélanger, & Brunet, 2016).

7.4.5 The Evaluation of an Intervention to Facilitate Thriving

The overarching mission of the field of psychology is to advance the creation, communication and application of psychological knowledge to benefit society and improve people's lives (American Psychological Association, 2015). The content included within this thesis attempts to address the first two of these mission objectives, by providing a conceptual and empirical foundation for understanding thriving in sport performers. In so doing, it also provides a starting point for the third objective; that is, it offers an initial grounding for the development of thriving interventions and their application in sport. Based on the findings presented in this thesis, it is suggested that initial interventions focus on the development of personal enablers and the mechanisms through which these impact thriving (see Section 7.3 for a discussion). Furthermore, and as recognized in Chapter 3, when developing such complex interventions researchers are advised to follow published guidelines (Craig et al., n.d.), and ensure that interventions achieve both intervention effectiveness and intervention efficacy for performance *and* well-being (see, American Psychological Association Presidential Task Force on Evidence-Based Practice, 2006). Such an objective will be achieved through a systematic programme of research (rather than a sole application), and researchers are, therefore, also encouraged to pursue both practice-based evidence and evidence-based practice (Barkham & Mellor-Clark, 2003; see, also, Brown & Fletcher, 2017).

7.5 Conclusion

Understanding how and why sport performers respond to competitive encounters in the manner that they do continues to be a fundamental focus of investigation in sport and performance psychology research. Literature in this area has been accumulating over many decades and much is now known about how athletes respond and the factors that may bring about these different experiences. However, one response that is yet to be systematically investigated is thriving. The purpose of this thesis was to begin the inquiry. Following a review and critique of the extant literature in the area, thriving was suggested to represent the joint

experience of development and success, which could be realized through effective holistic functioning and observed through the experience of a high-level of well-being and a perceived high-level of performance. Building on this conceptual position, results from four rigorous studies demonstrated that sport performers who thrive in competition exhibit distinct response patterns compared to individuals who do not thrive. Furthermore, the results suggested that levels of BPNS and challenge appraisal predict performers' in-match functioning, with higher levels on these two process variables resulting in thriving. More broadly, evidence was also found highlighting the complexity inherent in sport performers' match experiences and the role that personal and contextual enablers may play in facilitating athletes' functioning.

In conclusion, this thesis has offered an original contribution to the existing literature by demonstrating that it is possible to identify sport performers who thrive and by highlighting some of the mechanisms through which thriving can arise. These findings provide an initial foundation for scholars wanting to examine thriving in sport and offer a variety of possible avenues for coaches and practitioners looking to facilitate thriving in their athletes. Finally, it is hoped that the work included within this thesis will aid convergence in the thriving literature to ensure that individuals across all contexts are best supported in their quest for development *and* success in their lives.

References

- American Psychological Association. (2015). About APA. from <http://www.apa.org/about/>
- American Psychological Association Presidential Task Force on Evidence-Based Practice. (2006). Evidence-based practice in psychology. *American Psychologist*, 61, 271-285. doi:10.1037/0003-066X.61.4.271
- Arnetz, B. B., Nevedal, D. C., Lumley, M. A., Backman, L., & Lublin, A. (2009). Trauma resilience training for police: Psychophysiological and performance effects. *Journal of Police and Criminal Psychology*, 24, 1-9. doi:10.1007/s11896-008-9030-y
- Arnold, R., & Fletcher, D. (2012). A research synthesis and taxonomic classification of the organizational stressors encountered by sport performers. *Journal of Sport & Exercise Psychology*, 34, 397-429.
- Barkham, M., & Mellor-Clark, J. (2003). Bridging evidence-based practice and practice-based evidence: Developing a rigorous and relevant knowledge for the psychological therapies. *Clinical Psychology and Psychotherapy*, 10, 319-327. doi:10.1002/cpp.379
- Bartholomew, K. J., Ntoumanis, N., Ryan, R. M., Bosch, J. A., & Thøgersen-Ntoumani, C. (2011). Self-determination theory and diminished functioning: The role of interpersonal control and psychological need thwarting. *Personality and Social Psychology Bulletin*, 37, 1459-1473. doi:10.1177/0146167211413125
- Bartholomew, K. J., Ntoumanis, N., & Thøgersen-Ntoumani, C. (2009). A review of controlling motivational strategies from a self-determination theory perspective: Implications for sports coaches. *International Review of Sport and Exercise Psychology*, 2, 215-233. doi:10.1080/17509840903235330
- BBC. (2016a). Gareth Bale say Real Madrid are thriving under Zinedine Zidane. Retrieved from <http://www.bbc.co.uk/sport/football/36125142>
- BBC. (2016b). Olly Woodburn: Winger 'thriving' at Exeter says head coach Rob Baxter. Retrieved from <http://www.bbc.co.uk/sport/rugby-union/37473751>
- Bell, J. J., Hardy, L., & Beattie, S. (2013). Enhancing mental toughness and performance under pressure in elite young cricketers: A 2-year longitudinal intervention. *Sport, Exercise, and Performance Psychology*, 2, 281-297. doi:10.1037/a0033129

- Beltman, S., Mansfield, C., & Price, A. (2011). Thriving not just surviving: A review of research on teacher resilience. *Educational Research Review*, 6, 185-207. doi:10.1016/j.edurev.2011.09.001
- Benson, P. L., & Saito, R. (2001). The scientific foundation of youth development. In N. Jaffe (Ed.), *Youth development: Issues, challenges, and directions* (pp. 125-148). Philadelphia, PA: Public/Private Ventures.
- Benson, P. L., & Scales, P. C. (2009). The definition and preliminary measurement of thriving in adolescence. *The Journal of Positive Psychology*, 4, 85-104. doi:10.1080/17439760802399240
- Bonanno, G. A. (2004). Loss, trauma, and human resilience: Have we underestimated the human capacity to thrive after extremely adverse events? *American Psychologist*, 59, 20-28. doi:10.1037/0003-066X.59.1.20
- Brown, D. J., Arnold, R., Reid, T., & Roberts, G. (2017). *A qualitative inquiry of thriving in elite sport*. Manuscript submitted for publication.
- Brown, D. J., & Fletcher, D. (2017). Effects of psychological and psychosocial interventions on sport performance: A meta-analysis. *Sports Medicine*, 41, 77-99. doi:10.1007/s40279-016-0552-7
- BT Sport. (2016). Mark McCall backs Saracens players to thrive on cup atmosphere. Retrieved from <http://sport.bt.com/rugby-union/mark-mccall-backs-saracens-players-to-thrive-on-cup-atmosphere-S11364105466869>
- Bundick, M. J., Yeager, D. S., King, P. E., & Damon, W. (2010). Thriving across the life span. In R. M. Lerner, M. E. Lamb, & A. M. Freund (Eds.), *The handbook of life-span development* (pp. 882-923). Hoboken, NJ: John Wiley & Sons, Inc.
- Butler, R., & Hardy, L. (1992). The performance profile: Theory and application. *The Sport Psychologist*, 6, 253-264.
- Carpentier, J., & Mageau, G. A. (2013). When change-oriented feedback enhances motivation, well-being and performance: A look at autonomy-supportive feedback in sport. *Psychology of Sport and Exercise*, 14, 423-435. doi:10.1016/j.psychsport.2013.01.003
- Carver, C. S. (1998). Resilience and thriving: Issues, models, and linkages. *Journal of Social Issues*, 54, 245-266. doi:10.1111/0022-4537.641998064
- Cerasoli, C. P., Nicklin, J. M., & Nassreelrgawi, A. S. (2016). Performance, incentives, and needs for autonomy, competence, and relatedness: A meta-

- analysis. *Motivation and Emotion*, 40, 781-813. doi:10.1007/s11031-016-9578-2
- Churchill, G. A. (1979). A paradigm for developing better measures of marketing constructs. *Journal of Marketing Research*, 16, 64-73. doi:10.2307/3150876
- Cooper, C. L., & Cartwright, S. (1997). Workplace: An intervention strategy for workplace stress. *Journal of Psychosomatic Research*, 43, 7-16. doi:10.1016/S0022-3999(96)00392-3
- Craig, P., Dieppe, P., Macintyre, S., Michie, S., Nazareth, I., & Petticrew, M. (n.d.). *Developing and evaluating complex interventions: New guidance*. Retrieved from <http://www.mrc.ac.uk/documents/pdf/complex-interventions-guidance/>
- Cudeck, R., & Klebe, K. J. (2002). Multiphase mixed-effects models for repeated measures data. *Psychological Methods*, 7, 41-63. doi:10.1037/1082-989X.7.1.41
- Curran, P. J., Obeidat, K., & Losardo, D. (2010). Twelve frequently asked questions about growth curve modeling. *Journal of Cognition and Development*, 11, 121-136. doi:10.1080/15248371003699969
- Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11, 227-268. doi:10.1207/S15327965PLI1104_01
- Deci, E. L., & Vansteenkiste, M. (2004). Self-determination theory and basic need satisfaction: Understanding human development in positive psychology. *Ricerche di Psicologia*, 27, 17-34.
- Doron, J., & Martinent, G. (2016). Trajectories of psychological states of women elite fencers during the final stages of international matches. *Journal of Sports Sciences*, 34, 836-842. doi:10.1080/02640414.2015.1075056
- Edwards, D. J., & Edwards, S. D. (2012). The evaluation of a psychological skills training programme for rugby players. *African Journal for Physical, Health Education, Recreation & Dance*, 18, 525-534.
- Epel, E. S., McEwen, B. S., & Ickovics, J. R. (1998). Embodying psychological thriving: Physical thriving in response to stress. *Journal of Social Issues*, 54, 301-322. doi:10.1111/0022-4537.671998067
- Feeney, B. C., & Collins, N. L. (2015). A new look at social support: A theoretical perspective on thriving through relationships. *Personality and Social Psychology Review*, 19, 113-147. doi:10.1177/1088868314544222

- Fitzmaurice, G. M., Laird, N. M., & Ware, J. H. (2011). *Applied longitudinal analysis* (2nd ed.). Hoboken, NJ: John Wiley & Sons, Inc.
- Fletcher, D., Hanton, S., & Mellalieu, S. D. (2006). An organizational stress review: Conceptual and theoretical issues in competitive sport. In S. Hanton & S. D. Mellalieu (Eds.), *Literature reviews in sport psychology* (pp. 321-374). Hauppauge, NY: Nova Science Publishers.
- Fletcher, D., & Sarkar, M. (Eds.). (2016). Developing resilience [Special issue]. *Journal of Sport Psychology in Action*, 7(3).
- Folkman, S. (1992). Making the case for coping. In B. N. Carpenter (Ed.), *Personal coping: Theory, research, and application* (pp. 31-46). Westport, CT: Praeger Publishers/Greenwood Publishing Group.
- Ford, I. W., & Gordon, S. (1999). Coping with sport injury: Resource loss and the role of social support. *Journal of Personal & Interpersonal Loss*, 4, 243-256.
- Freeman, P., & Rees, T. (2009). How does perceived support lead to better performance? An examination of potential mechanisms. *Journal of Applied Sport Psychology*, 21, 429-441. doi:10.1080/10413200903222913
- Freeman, P., Rees, T., & Hardy, L. (2009). An intervention to increase social support and improve performance. *Journal of Applied Sport Psychology*, 21, 186-200. doi:10.1080/10413200902785829
- Galli, N., & Gonzalez, S. P. (2015). Psychological resilience in sport: A review of the literature and implications for research and practice. *International Journal of Sport and Exercise Psychology*, 13, 1-15. doi:10.1080/1612197X.2014.946947
- Galli, N., & Vealey, R. S. (2007). Thriving in the face of adversity: Applying the resiliency model to high-level athletes. *Journal of Sport & Exercise Psychology*, 29, S162-S163.
- Gaudreau, P., Nicholls, A., & Levy, A. R. (2010). The ups and downs of coping and sport achievement: An episodic process analysis of within-person associations. *Journal of Sport & Exercise Psychology*, 32, 298-311.
- Gonzalez, S. P., Detling, N., & Galli, N. A. (2016). Case studies of developing resilience in elite sport: Applying theory to guide interventions. *Journal of Sport Psychology in Action*, 7, 158-169. doi:10.1080/21520704.2016.1236050
- Goodwin, R., Costa, P., & Adonu, J. (2004). Social support and its consequences:

- 'Positive' and 'deficiency' values and their implications for support and self-esteem. *The British Journal of Social Psychology*, 43, 465-474.
doi:10.1348/0144666042038006
- Gordon, S., & Gucciardi, D. F. (2011). A strengths-based approach to coaching mental toughness. *Journal of Sport Psychology in Action*, 2, 143-155.
doi:10.1080/21520704.2011.598222
- Gould, D., Jackson, S. A., & Finch, L. M. (1993). Sources of stress in national champion figure skaters. *Journal of Sport & Exercise Psychology*, 15, 134-159.
- Greenleaf, C., Gould, D., & Dieffenbach, K. (2001). Factors influencing Olympic performance: Interviews with Atlanta and Nagano US Olympians. *Journal of Applied Sport Psychology*, 13, 154-184. doi:10.1080/104132001753149874
- Gucciardi, D. F., Jackson, B., Hodge, K., Anthony, D. R., & Brooke, L. E. (2015). Implicit theories of mental toughness: Relations with cognitive, motivational, and behavioral correlates. *Sport, Exercise, and Performance Psychology*, 4, 100-112. doi:10.1037/spy0000024
- Gucciardi, D. F., & Jones, M. I. (2012). Beyond optimal performance: Mental toughness profiles and developmental success in adolescent cricketers. *Journal of Sport & Exercise Psychology*, 34, 16-36.
- Gunnell, K. E., Bélanger, M., & Brunet, J. (2016). A tale of two models: Changes in psychological need satisfaction and physical activity over 3 years. *Health Psychology*, 35, 167-177. doi:10.1037/hea0000259
- Hardy, L., Roberts, R., Thomas, P. R., & Murphy, S. M. (2010). Test of Performance Strategies (TOPS): Instrument refinement using confirmatory factor analysis. *Psychology of Sport and Exercise*, 11, 27-35.
doi:10.1016/j.psychsport.2009.04.007
- Hollings, S., Mallett, C., & Hume, P. (2014). The transition from elite junior track-and-field athlete to successful senior athlete: Why some do, why others don't. *International Journal of Sports Science and Coaching*, 9, 457-472.
doi:10.1260/1747-9541.9.3.457
- Hsieh, P. (2013). Freedom, not fertility, is the key to a thriving economy. *Forbes*, 191, 34.
- Hunt, K., Wyke, S., Gray, C. M., Anderson, A. S., Brady, A., Bunn, C., . . . Treweek, S. (2014). A gender-sensitised weight loss and healthy living programme for

- overweight and obese men delivered by Scottish Premier League football clubs (FFIT): A pragmatic randomised controlled trial. *The Lancet*, 383, 1211-1221. doi:10.1016/S0140-6736(13)62420-4
- Jackson, D., Firtko, A., & Edenborough, M. (2007). Personal resilience as a strategy for surviving and thriving in the face of workplace adversity: A literature review. *Journal of Advanced Nursing*, 60, 1-9. doi:10.1111/j.1365-2648.2007.04412.x
- Jarrett, T. (2013). Warrior resilience and thriving (WRT): Rational emotive behavior therapy (REBT) as a resiliency and thriving foundation to prepare warriors and their families for combat deployment and posttraumatic growth in Operation Iraqi Freedom, 2005–2009. *Journal of Rational-Emotive & Cognitive-Behavior Therapy*, 31, 93-107. doi:10.1007/s10942-013-0163-2
- Jones, G. (1993). The role of performance profiling in cognitive behavioral interventions in sport. *The Sport Psychologist*, 7, 160-172.
- Jones, G. (1995). More than just a game: Research developments and issues in competitive anxiety in sport. *British Journal of Psychology*, 86, 449-478. doi:10.1111/j.2044-8295.1995.tb02565.x
- Jones, G., & Spooner, K. (2006). Coaching high achievers. *Consulting Psychology Journal: Practice and Research*, 58, 40-50. doi:10.1037/1065-9293.58.1.40
- Keyes, C. L. M. (1998). Social well being. *Social Psychology Quarterly*, 61, 121-140. doi:10.2307/2787065
- Kipp, L. E., & Weiss, M. R. (2013). Social influences, psychological need satisfaction, and well-being among female adolescent gymnasts. *Sport, Exercise, and Performance Psychology*, 2, 62-75. doi:10.1037/a0030236
- Lazarus, R. S. (1966). *Psychological stress and the coping process*. New York, NY: McGraw-Hill.
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York, NY: Springer.
- Le, H., Schmidt, F. L., Harter, J. K., & Lauver, K. J. (2010). The problem of empirical redundancy of constructs in organizational research: An empirical investigation. *Organizational Behavior and Human Decision Processes*, 112, 112-125. doi:10.1016/j.obhdp.2010.02.003
- Lerner, R. M., Dowling, E. M., & Anderson, P. M. (2003). Positive youth development: Thriving as a basis of personhood and civil society. *Applied*

- Developmental Science*, 7, 172-180. doi:10.1207/S1532480XADS0703_8
- Lundqvist, C. (2011). Well-being in competitive sports—The feel-good factor? A review of conceptual considerations of well-being. *International Review of Sport and Exercise Psychology*, 4, 109-127.
doi:10.1080/1750984x.2011.584067
- Macpherson, W. (2016). Ben Stokes thriving under license to lead England in the field. *The Guardian*. Retrieved from
<https://www.theguardian.com/sport/2016/oct/08/ben-stokes-thriving-license-to-lead-england>
- Mageau, G. A., & Vallerand, R. J. (2003). The coach-athlete relationship: A motivational model. *Journal of Sports Sciences*, 21, 883-904.
doi:10.1080/0264041031000140374
- Mahoney, M. J., Gabriel, T. J., & Perkins, T. S. (1987). Psychological skills and exceptional athletic performance. *The Sport Psychologist*, 1, 181-199.
- Mairs, G. (2016). Six Nations 2016: England's Billy Vunipola thriving on Eddie Jones' 'love and compassion'. *The Telegraph*. Retrieved from
<http://www.telegraph.co.uk>
- Mendes, W. B., Gray, H. M., Mendoza-Denton, R., Major, B., & Epel, E. S. (2007). Why egalitarianism might be good for your health: Physiological thriving during stressful intergroup encounters. *Psychological Science*, 18, 991-998.
doi:10.1111/j.1467-9280.2007.02014.x
- Mesagno, C., Hill, D. M., & Larkin, P. (2015). Examining the accuracy and in-game performance effects between pre- and post-performance routines: A mixed methods study. *Psychology of Sport and Exercise*, 19, 85-94.
doi:10.1016/j.psychsport.2015.03.005
- Moore, L. J., Vine, S. J., Wilson, M. R., & Freeman, P. (2015). Reappraising threat: How to optimize performance under pressure. *Journal of Sport & Exercise Psychology*, 37, 339-343. doi:10.1123/jsep.2014-0186
- Morgan, P. B. C., Fletcher, D., & Sarkar, M. (2013). Defining and characterizing team resilience in elite sport. *Psychology of Sport and Exercise*, 14, 549-559.
doi:10.1016/j.psychsport.2013.01.004
- Nagin, D. S., & Tremblay, R. E. (2001). Analyzing developmental trajectories of distinct but related behaviors: A group-based method. *Psychological Methods*, 6, 18-34. doi:10.1037/1082-989X.6.1.18

- O'Leary, V. E., & Ickovics, J. R. (1995). Resilience and thriving in response to challenge: An opportunity for a paradigm shift in women's health. *Women's Health, 1*, 121-142.
- Ohly, S., & Fritz, C. (2010). Work characteristics, challenge appraisal, creativity, and proactive behavior: A multi-level study. *Journal of Organizational Behavior, 31*, 543-565. doi:10.1002/job.633
- Orlick, T., & Partington, J. (1988). Mental links to excellence. *The Sport Psychologist, 2*, 105-130.
- Park, C. L. (1998). Stress-related growth and thriving through coping: The roles of personality and cognitive processes. *Journal of Social Issues, 54*, 267-277. doi:10.1111/0022-4537.651998065
- Park, C. L. (2004). The notion of growth following stressful life experiences: Problems and prospects. *Psychological Inquiry, 15*, 69-76.
- Park, C. L., Cohen, L. H., & Murch, R. (1996). Assessment and prediction of stress-related growth. *Journal of Personality, 64*, 71-105. doi:10.1111/j.1467-6494.1996.tb00815.x
- Pearson, M. (2014). Leading manufacturers thrive in a world of ongoing volatility and uncertainty. *Logistics Management, 53*, 22-22.
- Porath, C., Spreitzer, G., Gibson, C., & Garnett, F. G. (2012). Thriving at work: Toward its measurement, construct validation, and theoretical refinement. *Journal of Organizational Behavior, 33*, 250-275. doi:10.1002/Job.756
- Reinboth, M., Duda, J. L., & Ntoumanis, N. (2004). Dimensions of coaching behavior, need satisfaction, and the psychological and physical welfare of young athletes. *Motivation and Emotion, 28*, 297-313. doi:10.1023/B:MOEM.0000040156.81924.b8
- Reis, H. T., Sheldon, K. M., Gable, S. L., Roscoe, J., & Ryan, R. M. (2000). Daily well being: The role of autonomy, competence, and relatedness. *Personality and Social Psychology Bulletin, 26*, 419-435. doi:10.1177/0146167200266002
- Reivich, K. J., Seligman, M. E. P., & McBride, S. (2011). Master resilience training in the U.S. Army. *American Psychologist, 66*, 25-34. doi:10.1037/a0021897
- Rosenfeld, L. B., & Richman, J. M. (1997). Developing effective social support: Team building and the social support process. *Journal of Applied Sport Psychology, 9*, 133-153. doi:10.1080/10413209708415388

- Rutter, M. (1985). Resilience in the face of adversity: Protective factors and resistance to psychiatric disorder. *British Journal of Psychiatry*, 147, 598-611. doi:10.1192/bjp.147.6.598
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55, 68-78. doi:10.1037/0003-066X.55.1.68
- Ryan, R. M., & Deci, E. L. (2008). Self-determination theory and the role of basic psychological needs in personality and the organization of behavior. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *Handbook of personality: Theory and research* (3rd ed., pp. 654-678). New York, NY: Guilford Press.
- Sarkar, M., & Fletcher, D. (2014a). Ordinary magic, extraordinary performance: Psychological resilience and thriving in high achievers. *Sport, Exercise, and Performance Psychology*, 3, 46-60. doi:10.1037/spy0000003
- Sarkar, M., & Fletcher, D. (2014b). Psychological resilience in sport performers: A review of stressors and protective factors. *Journal of Sports Sciences*, 32, 1419-1434. doi:10.1080/02640414.2014.901551
- Scheier, M. E., & Carver, C. S. (1987). Dispositional optimism and physical well-being: The influence of generalized outcome expectancies on health. *Journal of Personality*, 55, 169-210. doi:10.1111/j.1467-6494.1987.tb00434.x
- Searle, B. J., & Auton, J. C. (2014). The merits of measuring challenge and hindrance appraisals. *Anxiety, Stress, & Coping*, 28, 121-143. doi:10.1080/10615806.2014.931378
- Seligman, M. E. P., & Csikszentmihalyi, M. (2000). Positive psychology: An introduction. *American Psychologist*, 55, 5-14. doi:10.1037/0003-066x.56.1.89
- Shalin, M. (2016). New England Patriots: Rob Gronkowski thriving with Tom Brady under center. *United Press International*. Retrieved from http://www.upi.com/Sports_News/2016/10/16/New-England-Patriots-Rob-Gronkowski-thriving-with-Tom-Brady-under-center/5781476667503/
- Sheldon, K. M. (2009). Providing the scientific backbone for positive psychology: A multi-level conception of human thriving. *Psihologijske Teme*, 18, 267-284.
- Simpson, J. A., Weiner, E. S. C., Murray, J. A. H., & Burchfield, R. W. (Eds.). (1989). *The Oxford English dictionary* (2nd ed.). Oxford, UK: Clarendon Press.

- Skinner, N., & Brewer, N. (2004). Adaptive approaches to competition: Challenge appraisals and positive emotion. *Journal of Sport & Exercise Psychology*, 26, 283-305.
- Smith, R. E., Smoll, F. L., & Ptacek, J. T. (1990). Conjunctive moderator variables in vulnerability and resiliency research: Life stress, social support and coping skills, and adolescent sport injuries. *Journal of Personality and Social Psychology*, 58, 360-370. doi:10.1037/0022-3514.58.2.360
- Smoll, F. L., Smith, R. E., Barnett, N. P., & Everett, J. J. (1993). Enhancement of children's self-esteem through social support training for youth sport coaches. *Journal of Applied Psychology*, 78, 602-610. doi:10.1037/0021-9010.78.4.602
- Spreitzer, G., & Porath, C. (2014). Self-determination as a nutriment for thriving: Building an integrative model of human growth at work. In M. Gagné (Ed.), *The Oxford handbook of work engagement, motivation, and self-determination theory* (pp. 245-258). New York, NY: Oxford University Press.
- Spreitzer, G., Porath, C. L., & Gibson, C. B. (2012). Toward human sustainability: How to enable more thriving at work. *Organizational Dynamics*, 41, 155-162. doi:10.1016/j.orgdyn.2012.01.009
- Spreitzer, G., Sutcliffe, K., Dutton, J., Sonenshein, S., & Grant, A. M. (2005). A socially embedded model of thriving at work. *Organization Science*, 16, 537-549. doi:10.1287/orsc.1050.0153
- Standage, M. (2012). Motivation: Self-determination theory and performance in sport. In S. M. Murphy (Ed.), *The Oxford handbook of sport and performance psychology* (pp. 233-249). New York, NY: Oxford University Press.
- Stock, D., & Bentley, J. (2009). Building and keeping a thriving workforce: The board's role. *Trustee*, 62, 31-32.
- Su, R., Tay, L., & Diener, E. (2014). The development and validation of the Comprehensive Inventory of Thriving (CIT) and the Brief Inventory of Thriving (BIT). *Applied Psychology: Health and Well-Being*, 6, 251-279. doi:10.1111/aphw.12027
- Tabachnick, B. G., & Fidell, L. S. (2013). *Using multivariate statistics* (6th ed.). London, UK: Pearson.

- Tedeschi, R. G., & Calhoun, L. G. (1996). The posttraumatic growth inventory: Measuring the positive legacy of trauma. *Journal of Traumatic Stress, 9*, 455-471. doi:10.1007/BF02103658
- Thomas, P. R., Murphy, S. M., & Hardy, L. (1999). Test of performance strategies: Development and preliminary validation of a comprehensive measure of athletes' psychological skills. *Journal of Sports Sciences, 17*, 697-711. doi:10.1080/026404199365560
- Vealey, R. S. (1988). Future directions in psychological skills training. *The Sport Psychologist, 2*, 318-336.
- Venkataramani, V., & Tangirala, S. (2010). When and why do central employees speak up? An examination of mediating and moderating variables. *Journal of Applied Psychology, 95*, 582-591. doi:10.1037/a0018315
- Walker, L. O., & Grobe, S. J. (1999). The construct of thriving in pregnancy and postpartum. *Nursing Science Quarterly, 12*, 151-157. doi:10.1177/08943189922106585
- Weston, N., Greenlees, I., & Thelwell, R. (2013). A review of Butler and Hardy's (1992) performance profiling procedure within sport. *International Review of Sport and Exercise Psychology, 6*, 1-21. doi:10.1080/1750984X.2012.674543
- Windhorst, B. (2015). Down two stars, Cavs thrive by getting defensive. Retrieved from <http://abcnews.go.com/Sports/stars-cavs-thrive-defensive/story?id=31632892>

Appendices

Appendix One: Psychometric Questionnaires

Variations of the questionnaires presented below were used in Studies 1, 2, and 3. Introductory wording was amended as appropriate to the study (i.e., Study 1: over the past month, Study 2: over the past two weeks; Study 3: at this time). Full references for the scales can be found in the reference lists of the respective chapters (see Sections 3.6, 4.6, and 5.6).

Subjective Performance (Pensgaard & Duda, 2003)

Please circle one number below to indicate how satisfied you have been, on average, with your performances in sporting encounters **over the past month**.

During my sporting encounters over the past month, my performances left me feeling...										
Totally Dissatisfied										Totally Satisfied
0	1	2	3	4	5	6	7	8	9	10

Vitality (Ryan & Frederick, 1997)

The following statements indicate how you might feel during your sporting encounters. Please indicate the accuracy of these statements in relation to how you felt during your sporting encounters **over the past month**.

During my sporting encounters over the past month...	Not at all true	Not true	Almost not true	Almost true	True	Very true
1) I felt alive and vital	1	2	3	4	5	6
2) I had energy and spirit	1	2	3	4	5	6
3) I nearly always felt alert and awake	1	2	3	4	5	6
4) I felt energized	1	2	3	4	5	6

Positive Affect (Thompson, 2007)

The following statements describe different feelings and emotions. Please indicate to what extent you have felt this way during your sporting encounters **over the past month**.

During my sporting encounters over the past month, I felt...	Never		Sometimes		Always
1) Alert	1	2	3	4	5
2) Inspired	1	2	3	4	5
3) Determined	1	2	3	4	5
4) Attentive	1	2	3	4	5
5) Active	1	2	3	4	5

Personal Resilient Qualities (Sarkar, Fletcher, Stride, & Munir, 2016)

The following statements describe personal qualities and thoughts that you may have displayed when dealing with sporting encounters **over the past month**. For each of the following statements, circle one box to indicate the extent to which you agree or disagree with the statement.

During my sporting encounters over the past month...	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1) I enjoyed competing against others	1	2	3	4	5
2) If I made a mistake, my confidence was not badly affected	1	2	3	4	5
3) I have constantly been looking for better ways to do things	1	2	3	4	5
4) Negative feedback from others has not affected my levels of confidence	1	2	3	4	5
5) I have actively chosen to engage with challenging situations	1	2	3	4	5
6) My sport provided me with an opportunity to be myself	1	2	3	4	5
7) My confidence has remained stable	1	2	3	4	5
8) I identified opportunities in the environment to improve my performance	1	2	3	4	5
9) Participation in my sport allowed me to live in a way that was true to my values	1	2	3	4	5
10) I have valued the benefits of my sport	1	2	3	4	5

Psychological Skills Use (Hardy, Roberts, Thomas, & Murphy, 2010)

The following statements relate to the psychological skills that you may have used during your sporting encounters **over the past month**. Please indicate how frequently you have used each skill.

During my sporting encounters over the past month...	Never	Rarely	Sometimes	Often	Always
1) I had thoughts of failure	0	1	2	3	4
2) I evaluated whether I achieved my goals	0	1	2	3	4
3) I set very specific goals	0	1	2	3	4
4) I kept my thoughts positive	0	1	2	3	4
5) I said things to myself to help my performance	0	1	2	3	4
6) I rehearsed the feel of my performance in my imagination	0	1	2	3	4
7) I managed my self-talk effectively	0	1	2	3	4
8) I set personal performance goals	0	1	2	3	4
9) I imagined my competitive routine before I did it	0	1	2	3	4
10) I imagined screwing up	0	1	2	3	4
11) I talked positively to myself	0	1	2	3	4
12) I rehearsed my performance in my mind	0	1	2	3	4
13) My emotions kept me from performing my best	0	1	2	3	4
14) My emotions got out of control	0	1	2	3	4
15) I allowed the whole skill or movement to happen naturally without concentrating on each part	0	1	2	3	4
16) I used relaxation techniques as a coping strategy	0	1	2	3	4
17) I had difficulty controlling my emotions if I made a mistake	0	1	2	3	4
18) I psyched myself to perform well	0	1	2	3	4
19) I used relaxation techniques to improve my performance	0	1	2	3	4
20) If I started to 'lose it', I used a relaxation technique	0	1	2	3	4
21) I got my intensity levels just right	0	1	2	3	4
22) I was able to trust my body to perform skills	0	1	2	3	4
23) I was sufficiently prepared to be able to perform on automatic pilot	0	1	2	3	4
24) I got myself 'up' if I felt flat	0	1	2	3	4

Social Support (Freeman, Coffee, & Rees, 2011)

The following statements ask you to consider the extent to which you have had these types of support available to you during your sporting encounters **over the past month**. Please indicate the extent to which the following occurred.

During my sporting encounters over the past month, if needed, someone...	Not at all	Slightly	Moderately	Considerably	Extremely
1) Provided me with comfort and security	0	1	2	3	4
2) Reinforced the positives	0	1	2	3	4
3) Helped with travel to training and matches	0	1	2	3	4
4) Enhanced my self-esteem	0	1	2	3	4
5) Gave me constructive criticism	0	1	2	3	4
6) Helped with tasks to leave me free to concentrate	0	1	2	3	4
7) Gave me tactical advice	0	1	2	3	4
8) Was always there for me	0	1	2	3	4
9) Instilled me with the confidence to deal with pressure	0	1	2	3	4
10) Did things for me at competitions/matches	0	1	2	3	4
11) Cared for me	0	1	2	3	4
12) Boosted my sense of competence	0	1	2	3	4
13) Gave me advice about performing in competitive situations	0	1	2	3	4
14) Showed concern for me	0	1	2	3	4
15) Gave me advice when I was performing poorly	0	1	2	3	4
16) Helped me organise and plan my competitions/matches	0	1	2	3	4

Coach Needs Supportive and Needs Thwarting Behaviours (Rocchi, Pelletier, Cheung, Baxter, & Beaudry, 2017)

The following statements represent different types of behaviours that people in your sport might exhibit. Please indicate how much you agree or disagree with the following statements about your coach **over the past month**.

During my sporting encounters over the past month, my coach...	Do not agree			Somewhat			Completely	
	1	2	3	4	5	6	7	
1) Gave me the freedom to make my own choices	1	2	3	4	5	6	7	
2) Supported my decisions	1	2	3	4	5	6	7	
3) Supported the choices I made for myself	1	2	3	4	5	6	7	
4) Encouraged me to make my own decisions	1	2	3	4	5	6	7	
5) Pressured me to do things their way	1	2	3	4	5	6	7	
6) Imposed their opinions on me	1	2	3	4	5	6	7	
7) Pressured me to adopt certain behaviours	1	2	3	4	5	6	7	
8) Limited my choices	1	2	3	4	5	6	7	
9) Encouraged me to improve my skills	1	2	3	4	5	6	7	
10) Provided valuable feedback	1	2	3	4	5	6	7	
11) Acknowledged my ability to achieve my goals	1	2	3	4	5	6	7	
12) Told me that I can accomplish things	1	2	3	4	5	6	7	
13) Pointed out that I will likely fail	1	2	3	4	5	6	7	
14) Sent me the message that I am incompetent	1	2	3	4	5	6	7	
15) Doubted my capacity to improve	1	2	3	4	5	6	7	
16) Questioned my ability to overcome challenges	1	2	3	4	5	6	7	
17) Was interested in what I do	1	2	3	4	5	6	7	
18) Took the time to get to know me	1	2	3	4	5	6	7	
19) Honestly enjoyed spending time with me	1	2	3	4	5	6	7	
20) Related to me	1	2	3	4	5	6	7	
21) Did not comfort me when I was feeling low	1	2	3	4	5	6	7	
22) Was distant when we spent time together	1	2	3	4	5	6	7	
23) Did not connect with me	1	2	3	4	5	6	7	
24) Did not care about me	1	2	3	4	5	6	7	

Challenge and Threat Appraisal (McGregor & Elliot, 2002) – Full and diary format

The following statements describe how you might have felt about your sporting encounters **over the past month**. For each of the following statements, circle one box to indicate the extent to which the statement was true for you.

Challenged = you perceived that you could overcome the sporting encounter

Threatened = you perceived that difficulty was likely to have a negative impact and you did not think that you could overcome the sporting encounter

During my sporting encounters over the past month...	Not at all true							Very true of
1) I viewed the sporting encounters as a positive challenge	1	2	3	4	5	6	7	
2) I viewed the sporting encounters as a threat	1	2	3	4	5	6	7	
3) I thought the sporting encounters represented a positive challenge to me	1	2	3	4	5	6	7	
4) I thought the sporting encounters represented a threat to me	1	2	3	4	5	6	7	

Basic Psychological Needs Satisfaction (Ng, Lonsdale, & Hodge, 2011) – Diary format

The following statements ask you about how you currently feel about Premier Division hockey. Please indicate how true the statements are for you **at this time**.

In relation to my involvement in Premier Division hockey, currently...	Not true at all							Very true
1) I feel I participate in my sport willingly	1	2	3	4	5	6	7	
2) I have the ability to perform well in my sport	1	2	3	4	5	6	7	
3) I have close relationships with people in my sport	1	2	3	4	5	6	7	

Basic Psychological Needs Satisfaction and Frustration (Chen et al., 2015; Ng et al., 2011) – Full format

The following statements ask you about how you have felt during your sporting encounters. Please indicate how true the statements are for your sporting encounters **over the past month**.

During my sporting encounters over the past month, I felt...	Not true at all							Very true						
1) I could overcome challenges in my sport	1	2	3	4	5	6	7							
2) I could take part in the decision-making process	1	2	3	4	5	6	7							
3) Excluded from the group I wanted to belong to	1	2	3	4	5	6	7							
4) I really had a sense of wanting to be there	1	2	3	4	5	6	7							
5) Close to other people	1	2	3	4	5	6	7							
6) I was skilled at my sport	1	2	3	4	5	6	7							
7) I participated in my sport willingly	1	2	3	4	5	6	7							
8) I had serious doubts about whether I could do things well	1	2	3	4	5	6	7							
9) Forced to do many things I wouldn't choose to do	1	2	3	4	5	6	7							
10) I showed concern for others in my sport	1	2	3	4	5	6	7							
11) I was good at my sport	1	2	3	4	5	6	7							
12) I got opportunities to make decisions	1	2	3	4	5	6	7							
13) Disappointed with my performance	1	2	3	4	5	6	7							
14) Pressured to do too many things	1	2	3	4	5	6	7							
15) There were people in my sport who cared about me	1	2	3	4	5	6	7							
16) I got opportunities to feel that I was good at my sport	1	2	3	4	5	6	7							
17) I had the impression that people I spent time with disliked me	1	2	3	4	5	6	7							
18) I was doing what I wanted to be doing	1	2	3	4	5	6	7							
19) Insecure about my abilities	1	2	3	4	5	6	7							
20) There were people who I could trust	1	2	3	4	5	6	7							
21) I had the ability to perform well in my sport	1	2	3	4	5	6	7							
22) I chose to participate in my sport according to my own free will	1	2	3	4	5	6	7							
23) I had close relationships with people in my sport	1	2	3	4	5	6	7							
24) My daily activities felt like a chain of obligations	1	2	3	4	5	6	7							
25) The relationships I had were just superficial	1	2	3	4	5	6	7							

Appendix Two: IRT Analysis

In order to reduce the burden placed on participants in Study 3, it was necessary to reduce the number of items included in the assessment of basic psychological needs. Item Response Theory analysis was conducted on responses to the full Basic Needs Satisfaction in Sport Scale (Ng et al., 2011) collected from 535 sport performers. The tables below show the item discrimination statistics for the autonomy, competence, relatedness subscale items, with higher values for the index (a) indicating higher discrimination. The labels within the tables correspond to the item numbers in the scale presented on the previous page.

Table S 1 *Autonomy Satisfaction Items*

Item	Label	a
1	iBPN2	1.56
2	iBPN4	1.68
3	iBPN7	2.33
4	iBPN12	1.45
5	iBPN18	1.91

Table S 2 *Competence Satisfaction Items*

Item	Label	a
1	iBPN11	2.29
2	iBPN16	2.44
3	iBPN21	2.83

Note. iBPN1 and iBPN6 were excluded because responses did not cover the full range of options.

Table S 3 *Relatedness Satisfaction Items*

Item	Label	a
1	iBPN5	2.07
2	iBPN10	0.85
3	iBPN15	2.01
4	iBPN20	2.20
5	iBPN23	3.14

Appendix Three: Study 4 Example Interview Guide

Section 1: Introduction

Intro	Interview Questions	Probes
1.1	To begin, please can you tell me a little more about your hockey and how you got involved?	Who play for? When started playing? When first appearance for [club] was? Any international caps? Biggest achievement in hockey? What your day job is?
1.2	Now, if we could focus in on the game on Sunday, how did that game go for you?	Personal performance Enjoyment How did this compare to your other recent matches for [club]?

Section 2: Preparation (distinguish between days and hours before)

Prep	Interview Questions	Probes
2.1	How did you feel before the game?	What influenced these feelings? Is it typical for you to feel like this before a match?
2.2	Can you tell me about your preparation for the game?	What did it entail? Was this typical for you/was there anything different that you think was important? What do you think are the important factors for your match preparation?
2.3	Do you think aspects of your personality impact your match experience? If so, what impact do you feel that had on you?	

2.4	Do you use any psychological skills in your preparation for matches? If so, how do these impact your match experience?	Were they helpful/unhelpful? When did you use them? Why didn't you use others?
2.5	How would you describe your relationships with your teammates? Do you think that your relationship with your teammates impacted your match experience?	How did the support change? Was this support helpful/unhelpful? How did it impact on you?
2.6	How would you describe your relationship with [coach name]? Do you think that your relationship with [coach] impacted your match experience?	Talk through, Thoughts on coaches role Impact on them
2.7	Over and above what we have discussed, are there any other factors that you think might have explained your performance and well-being, and thus your potential to thrive on Sunday afternoon?	Sleep? Fatigue

Section 3: Match

	Interview Questions	Probes
3.1	Now, if we could focus in on the game on Sunday, you put down a score of X for performance satisfaction, can you talk me through that?	What led to this score? Do you think any of the factors that we have discussed contributed to your score? What do you think may have increased it? How did this compare to your other recent matches for Reading – when you thrived/didn't thrive?
3.2	I also asked you to rate your well-being after the game on a number of scales, on the whole you rated yourself highly/lowly, can you talk me through this?	Vitality Positive affect What led to this score? Do you think any of the factors that we have discussed contributed to your score?

		What do you think may have increased it? How did this compare to your other recent matches for Reading – when you thrived/didn't thrive?
3.3	How aware were you of your teammates' performances/well-being? Did this affect you in any way?	
3.4	How do you think that your performance/well-being could have been improved?	Focus on factors leading up to the match (i.e., resilient qualities, psych skills use, social support, coach support).

Section 4: Any Lasting Effects

	Interview Questions	Probes
4.1	We are now X days on from the fixture, do you think that the match has affected you in any way?	

Appendix Four: Study 4 Supporting Quotations

Table S 4 *Thriving and Non-Thriving Groups' Relationships between Codes and Supporting Quotations*

Relationship	Supporting Quotation
Workload → ²⁶ Preparation – stress-free	<p><i>Thriving group</i></p> <p>And sometimes I do bring that [bad mood] into games, if they're friendly matches here or an away trip, but because Friday I didn't have any coaching I was pretty stress-free. (#4)</p>
Workload → ²⁴ Fatigue → ²⁵ Preparation – sub-optimal Travelling → ¹ Fatigue → ²⁵ Preparation – sub-optimal	<p><i>Non-thriving group</i></p> <p>Extremely tired. Really tired actually. Tried to get to sleep on the way down...I was working until ten to 4. Then meeting at 4 to come straight down the road to play. So no, in that regard I wasn't physically ... And mentally as well, that was before the...there was a lot of up and down to [place name] that week so there was a lot of mileage for two training sessions and two matches. Probably not the best preparation but not a whole pile I can do really. Really tired and probably mentally quite weak. (#10)</p>
Workload → ²⁴ Fatigue Travelling → ¹ Fatigue	<p>So they [previous matches] went really well but I was shattered because I flew home Monday morning. I was shattered flying home Monday and then training Tuesday. We trained hard Tuesday, we were on the pitch for about 3 and half hours so I was just shattered. And then back into work properly Tuesday, work a bit Wednesday, and then we played Wednesday night. We trained Thursday, it was kind of a busy</p>

<p>Workload →²⁶ Preparation – rushed →⁴³ Teammate interactions</p> <p>Workload →²⁶ Preparation – atypical Venue →⁷ Perceived match importance →¹⁰ Preparation – atypical</p>	<p>week to be honest. (#11)</p> <p>I think everyone working that day definitely did affect the group environment. Because everybody came in and you could tell everyone was rushed and trying to get themselves sorted out. There definitely wasn't as much interaction between players. Because I think they all had to put themselves out of their work-world and into playing mode. (#11)</p> <p>It was a lot less regimented than it would have normally been for this match. And I guess it was probably the nature of the match, that it was on a Friday and a lot of our players didn't have time off work.... it's unfair to say it was a friendly match because that wasn't the case at all, ... but there's no external importance, there's no ranking points, no medals at the end of it... You get a cap, I suppose that's the importance of it, and the fact that you were playing at home. But the nature of the game, it's just not a tournament game, which then makes it slightly different focus than it normally would have. (#13)</p>
<p>Travelling →³ Feel – uptight Teammate interactions + Arousal regulation strategies →⁴⁸ Pre-match: Feel – relaxed</p>	<p><i>Thriving group</i></p> <p>So, the only thing was getting through all that traffic. I get quite road-ragey during traffic. So maybe I was a bit tense coming in, but then once I got into the changing room I had the banter, like I normally do and that calmed me down. Went to the toilet twice and I was fine. (#4)</p> <p><i>Non-thriving group</i></p>

<p>Travelling →² Preparation – rushed</p> <p>Travelling →² Preparation – sub-optimal</p>	<p>And then Friday was the game that you were doing the study on and I was straight into the car from work and didn't really get a decent meal in me. Got a sandwich on the way down ... I didn't really have much time to think about the game and prepare myself, to stretch ... I think it was the toll of the travel and just mentally I just wasn't there. Preparation for the Friday game was no existent. (#10)</p>
<p>Travelling →² Preparation – atypical</p> <p>Travelling →² Preparation – sub-optimal →⁶⁹ Personal performance / skill execution</p>	<p>On Friday itself for me, there was probably a bit more travel than what would normally be prescribed before an international match. I had an hour and a half drive at five o'clock in the morning to get to the airport for 6:30. Then an hour's flight. And yea, that probably doesn't lend itself to performing ... or physically performing at your best. (#13)</p>
<p>Fatigue →⁶³ Personal performance / skill execution</p>	<p><i>Thriving group</i> N/A</p> <p><i>Non-thriving group</i> Do you think that there is anything else that might have affected the way that you played on Friday? Fatigue. Like this week now, I'm just wrecked. (#11)</p>
<p>Lack of physical readiness →⁵ Pre-match: Feel – nervous</p>	<p><i>Thriving group:</i> N/A</p> <p><i>Non-thriving group:</i> Since our last big competition which was at the end of August, I'd not done an awful lot fitness-wise. I've done my respective club things,</p>

<p>Lack of physical readiness →⁶ Targeted playing standards</p> <p>Lack of physical readiness →⁶⁴ Personal performance / skill execution</p>	<p>with the odd gym session here and there, but nothing that would constitute a program. So fitness-wise I was probably a little bit apprehensive going in. (#13)</p> <p>I wasn't expecting to be in my best shape, in comparison to the other fixtures and other tournaments recently, but I feel maybe, yea...from a fitness point of view, I guess you are looking at a 3, 4 out of 10, compared to where I normally am, or when I'm at my best. (#13)</p> <p>I guess the physical factors would have definitely affected my performance. I wasn't feeling in great shape. So I maybe ... hindered what I maybe wanted to do, or how much running I could actually have done. (#13)</p>
<p>Injury →⁶⁰ Arousal regulation strategies</p> <p>Injury →⁶¹ Expectations</p> <p>Injury + Targeted playing standards →³³ Pre-match: Feel – nervous</p> <p>Injury + Targeted playing standards →⁹⁸ Performance satisfaction /</p>	<p><i>Thriving group:</i> I was feeling it [the injury] a wee bit before going into the game, but, if it's sore going into Friday's game, or any game, I usually get try zoning out. (#4)</p> <p>I knew my shin would start to get sore between period 3 and 4, but it actually got sore during period 2. So it was a wee bit sooner than we thought it would be, but I'd still rather play on, so I'd never ever bring that into whether my performance is affected or not. (#4)</p> <p>I was happy with my own individual performance, especially as I'd been injured in the build-up so I was a little apprehensive about the</p>

dissatisfaction	standard I'd be. But I was really happy with my own personal performance. (#5)
Injury → ⁵² Pre-match: Feel – nervous	To be honest, the anxiety about my shoulder, by the time the game started, I wasn't even thinking about it. It wasn't there. So I just focused on the game, to be honest. (#5)
Injury → ⁴⁴ Preparation – sub-optimal + Targeted playing standards → ³² Pre-match: Feel – nervous Injury → ⁴⁴ Preparation – sub-optimal + Targeted playing standards → ⁹⁹ Performance satisfaction / dissatisfaction	I did training on the Thursday night, a week before the playoff, and then I didn't play a full game until the Tuesday in the week leading up to the playoffs. So I was a little bit apprehensive of if I was going to be a little bit rusty or not, but to be fair I thought played well considering I had that injury. But obviously it's not ideal preparation for the playoffs. (#5)
Injury + Returning to the squad → ⁵³ Pre-match: Feel – excited Opponents + Past performances → ³⁸ Pre-match: Feel – confident	I was pretty confident going into the game. We'd beaten [opponents' name] twice this season already and, the previous games we've played, we've played really well. We beat two other tough teams, so I felt like we really had the momentum going into the game. So I was going in on all fired, a little bit of confidence, from a team perspective as well, going in with momentum from our last two games and also I was just looking forward to running around again [after being out with the injury], to be honest. (#5)
Injury → ³⁴ Targeted playing standards + Personal performance / skill execution → ¹¹² Performance satisfaction / dissatisfaction	Personally, I was playing as well as I would hope to, as I said I have been injured quite a lot so I have only played two of the National

<p>Injury + Returning to the squad + Teammate interactions + Match outcome →⁹⁶ Enjoyment levels</p> <p>Injury + Returning to the squad →⁹⁷ Performance satisfaction / dissatisfaction →¹³⁴ Increased confidence</p> <p>Injury →⁶⁶ Personal performance / skill execution Injury →⁶⁵ Personal contribution</p>	<p>League games this year, so I sort of knew everything probably wasn't sort of going to go 100% right and a couple of mistakes here and there but overall, I was pretty happy with the way it went, yeah. (#6)</p> <p>Obviously, I hadn't played for a while [due to the injury], it's really good to be back playing and you can go to the gym and do your running and stuff and it's just a completely different feeling to actually going out there with your mates and winning a decent game. So that obviously contributes to it [enjoyment], as I haven't done it [played hockey] for quite a few weeks. (#6)</p> <p>Personally, yeah because I was pretty pleased with the way I played considering I hadn't been playing much [due to injury] so that will definitely give me confidence when we restart after Christmas. (#6)</p> <p><i>Non-thriving group:</i> Mid-way through, towards the start of the second half, I got a hit on the finger and I couldn't really bend that finger, I couldn't really do what I wanted to do with my passes and dribbling and whatnot, so I felt that I sort of — not just out of the game, but I didn't really have the opportunity to make a mark on the game. (#18)</p>
<p>Venue →⁷⁰ Team performance</p>	<p><i>Thriving group</i> I don't want to blame anything else but the pitch at [venue name] is quite slow and the style of hockey we play is fast and pretty electric. We like to go for it pretty early doors and it's harder to do on that pitch.</p>

<p>Venue →⁹ Crowd →²¹ More pressure →²³ Resilience</p>	<p>You've got to be a lot more patient. (#5)</p> <p><i>Non-thriving group</i></p> <p>It's not often that I'm back in [name of country] playing. It doesn't happen that often, so a lot of people have these pre-conceptions, so '[player name] this...' or '[player name] that...'. And expect me to do this, that, or the other and do it brilliantly. Or to do it badly or whatever it might be. So if I do something poor, I need to be quite resilient and not affected by Joe Average in the crowd saying 'oh [player name] with 190 caps, he's shite'. So you need to be fairly resilient in that aspect as well I guess. (#13)</p>
<p>Venue →⁴ Travelling →² Preparation – atypical →⁴⁵ Pre-match: Feel – relaxed</p>	<p>We travel down to [city name] a lot for training, but international matches we are usually away in another country. I think that was our first international match at home in a year. So we are usually away or travel on a bus, so it's unusual to travel in your own car with a few other people to an international match. It was a little bit more relaxed. (#14)</p>
<p>Venue →⁸ Preparation – atypical →^{N/A} Preparation – sub-optimal</p>	<p>Because of being at [venue name] it was slightly different as we got there a little bit earlier, which meant that we met at a different time which wasn't ideal really, because I like to try and get [my preparation] sorted as the usual routine. (#15)</p>
<p>Venue →⁸ Preparation – atypical →^{N/A} Preparation – sub-optimal →⁶⁸</p>	<p>The thing that I have found, was that when we have home games</p>

<p>Personal contribution Venue →⁸ Preparation – atypical →^{N/A} Preparation – sub-optimal →⁶⁹ Personal performance / skill execution</p> <p>Venue →⁸ Preparation – atypical →⁴⁵ Pre-match: Feel – relaxed</p>	<p>sometimes we have to do some coaching, for the junior section before our games, and I just find that – it detracts from our match itself ... You turn up like four hours before the game, rather than an hour and a half, and then you've got to figure out hydration and it sort of ruins your schedule a bit. You haven't got your set plan and not everyone's there at the same time, and I think that detracts from just turning up and concentrating on doing your job to win the game ... I find it distracts me a bit from my playing. (#16)</p> <p>Most games when I'm playing at home, I'll coach in the morning and then I'll go and start getting ready for the game, but with the meet time [for the alternative venue], we didn't really have that luxury to do that. I think that sort of helped me with just being relaxed and almost getting up, going and then being ready for it. (#18)</p>
<p>Late selection →⁴¹ Preparation – atypical</p> <p>Late selection →⁴¹ Preparation – atypical →^{N/A} Preparation – rushed</p>	<p><i>Thriving group:</i> N/A</p> <p><i>Non-thriving group:</i> It was a bit of a shock to realize I was playing and it took me a little time [to get ready]. Because I hadn't really done the usual shit I would always do if I knew I was playing that day, so it took me a bit of time. But then I did manage to get together and I felt good about coming on. (#11)</p> <p>So on the morning of the game, were you working on Friday?</p>

<p>Late selection →⁴⁶ Pre-match: Feel – uptight</p> <p>Late selection →⁴⁶ Pre-match: Feel – uptight Past performances →²² Less pressure</p>	<p>Yea. So I wouldn't normally do that if I knew I was playing. I was at work at 7 in the morning, so worked 7-10:30 and then I had another client right before, I had to race over to make sure that I was there for the meet time. (#11)</p> <p>I was definitely more up-tight than I normally am [following the late call-up]. But I did manage to get back to that state, but I wasn't as comfortable. (#11)</p> <p>It probably felt less pressured in a weird way. Like it wasn't the most comfortable because I wasn't expecting to play, but I'd had such a good weekend with the club. I felt pretty good, no more pressure than normal. (#11)</p>
<p>Returning to the squad →⁵⁴ Pre-match: Feel – determined</p> <p>Returning to the squad →¹³ Perceived match importance →¹² Pre-match: Feel – excited</p>	<p><i>Thriving group:</i> I think you feel like you've got something to prove [after being recalled to the squad]. You're always disappointed to not be on the list in the first place and you are always looking around to see who else has been selected and how you feel about that. So I kind of felt like I had something to prove and really wanted to put a marker down. (#3)</p> <p>I think normally I am buzzing for a match day, because it's [being selected has] only happened six times and every time it does feel like a massive opportunity and a massive privilege. I don't really need anything more than that to get me psyched up. (#3)</p>

Returning to the squad + Past performances → ²⁸ More pressure	<i>Non-thriving group:</i> Especially having been out...the summer group that went and had success in the [competition name]. That team was there was for a long time together and I wasn't part of that. And coming back into the squad was quite hard, because ...it feels like a new cap again because they had done so well. (#10)
Returning to the squad + Past performances → ²⁸ More pressure	It is hard to come back [into the squad] and put your stamp on it. Especially given how well the boys did and you just trying to get back in the flow of things... I wouldn't say it's stressful, but yea it would definitely be in the back of your mind. You know "I'm going to have to perform now, make sure I make no mistake". (#10)
Returning to the squad + Personal performance / skill execution → ¹¹¹ Decreased sense of belonging Personal performance / skill execution → ¹⁰⁷ Decreased confidence	Friday night especially, my confidence was completely shattered because of a couple of mistakes that led to a goal. I would say confidence-wise that's why it took a hammering and I felt that...there was no feeling of belonging there. Again, it will just take time to get back into the set-up and I just need to make sure that I don't make any more mistakes (#10)
Crowd → ²⁰ Pre-match: Feel – nervous → ¹⁴⁷ Enjoyment levels	<i>Thriving group:</i> And obviously you get a little bit of nerves playing in front of a big crowd, especially like that, but for me, I quite enjoy that. I think it gets me up for the game a little bit more. (#5)
Crowd → ²⁰ Pre-match: Feel – nervous	I was quite nervous before the game. In the half hour building up to it

Crowd → ²¹ More pressure	<p>I was thinking about the amount of people watching and I was anxious to get out onto the pitch and play. (#8)</p> <p><i>Non-thriving group:</i></p> <p>Is there anything else that you think affects the way that you play on a weekend?</p> <p>Who's watching, if my parents are there, if my friends are there, girlfriend there, so like I have to perform. (#9)</p>
<p>Coach interactions →⁹³ Critical moment + Teammate interactions →⁸⁴ In-match: Feel – frustrated</p> <p>Coach interactions →⁹³ Critical moment →⁹⁵ Personal contribution</p> <p>Coach interactions →⁹³ Critical moment →⁷⁸ Personal performance / skill execution</p>	<p><i>Thriving group:</i></p> <p>[The coach] all year had this substitution sheet and we get different minutes and when we're coming on. When it's big games he's completely ignored it, and it's the first time in the whole time I've been there he's just stuck by it without even saying anything. And the people who were playing well, so me and [teammate name], and [teammate name], I thought we were playing really well, and we came off. We were talking to each other on the bench and saying we hadn't been on for ten-minutes, and it got me really frustrated and then when I went back on, obviously I wanted to try and do as well for the team, but I just felt like while I was sitting on the bench I couldn't really do anything, so it was a bit of a mixed emotion when I went back on. (#2)</p> <p>Consistency of [the coach] probably. Like the first half, I thought I had a really good half to be fair, it was the second half where [the coach] had got in my head because I didn't come on for like fifteen minutes at one time, which is half of the second half. (#2)</p>

Coach interactions + Familiarity → ³⁰ Pre-match: Feel – confident	<p>This year, I am a lot more comfortable playing because I have done it for a year and also, [the coach] stuck me in those games when I had been away, that gives you a lot of confidence as well. (#6)</p>
Coach interactions → ²⁹ Arousal regulation strategies	<p><i>Non-thriving group:</i></p> <p>So the [name of opponents] game, because I spoke to [the coach] midweek, I actually made a big effort to try and change the way that mentally I was. The week before ... anything I did wrong, it annoyed me. So going into the [name of opponents] game I changed the way I was a bit, I think that helped me a lot. (#9)</p>
Coach interactions → ²⁹ Arousal regulation strategies → ⁷¹ Personal performance / skill execution	<p>Well, for me that was probably my best game of the season. I had a chat with [the coach] midweek and he was discussing how he feels I'm being too hard on myself and it's almost if I make a mistake it really gets to me. It does, quite frankly like if I do make a mistake, it does get to my head a bit. So I took that into consideration on Tuesday and then just went into the game mentally differently than I would've at every other game. I just a less focused approach, it worked better. And as a performance, I got man of the match, scored two goals, assisted one, like that was an extremely good game for me. (#9)</p>
Coach interactions + Perceived match importance → ¹⁷ More pressure	<p>I think he [the coach] changed a bit ... It was almost like, everything we were doing in training was focused on that one game. So I think when it actually got to that final game, I think he was certainly a lot</p>

<p>Coach interactions →³¹ Targeted playing standards + Personal performance / skill execution →¹¹² Performance satisfaction / dissatisfaction</p> <p>Coach interactions →⁸⁵ In-match: Feel – confident</p> <p>Coach interactions →⁸⁰ Personal performance / skill execution</p> <p>Coach interactions →⁹¹ Team performance</p>	<p>more frustrated with kind of how we were playing and what individuals were doing than he had been earlier in the season. Like I can recall him shouting something at me off the side-line, which I'd not had all season. I don't know, it's almost like everything was on that game ... it probably put a bit more pressure on. (#12)</p> <p>I like to think I played maybe a seven out of ten, nothing amazing - not poor in any way, nothing amazing, just kind of the way [coach's name] wanted us almost to play, it was just solid. Keep things really simple. So I guess I did that in that respect okay. Obviously managed to score but would've definitely liked to have scored another goal. (#12)</p> <p>Chatted to the coach before the match and then, during the match he was supportive. So I felt good during the match, didn't have any self-doubt. (#14)</p> <p>Without him [the coach] saying anything, it is a positive, then on a weekend – on my first goal, the short corner, he said to do a certain routine and put it in a certain place in the goal, and it was successful. So, again, that helps with my success in the game. (#16)</p> <p>I think, he [the coach] could have been a bit more inspirational at half time ... almost driving us into playing better hockey. (#18)</p>
<p>Teammate interactions + Arousal regulation strategies →⁴⁸ Pre-</p>	<p><i>Thriving group:</i> When people in the training room like to get fired up, because I know</p>

match: Feel – relaxed	I don't like it, I try and just make sure I'm staying calm. (#2)
Teammate interactions + Personal performance / skill execution → ⁷⁵ In-match: Feel – nervous → ⁷³ Personal performance / skill execution	I just felt in the first half that I did something wrong and someone shouts at you and then you do the next thing wrong because you're nervous. It can work both ways. (#3)
Teammate interactions + Personal performance / skill execution → ⁷⁵ In-match: Feel – nervous	So going back to the [name of opponents] game, it was [teammate name] in particular that was getting really riled up about me being out of position and that kind of makes it worse because it's like, "I really don't want to piss [teammate name] off, I really want to impress him." (#3)
Teammate interactions + In-match: Feel – nervous → ⁷⁶ Personal performance / skill execution	I think in the first half, yes you can argue there was a mix up [between me and one of the other players], but I think because I got nervous I stopped talking and normally I'm one of the better ones for chatting away because I consciously do it as a means to work my way into the game and I think that was quite damaging. (#3)
Teammate interactions → ⁴⁹ Pre-match: Feel – confident Teammate interactions → ⁵⁹ Sense of cohesion	Going back to [teammate name] doing laps of the changing room, you always find in the warm up there will be [teammate name] and [teammate name] will be like just positive vibes, positive vibes, like loads of chat and consciously going round and interacting with everybody in the group and I feel that is really effective at getting everyone a) together and b) very positive and psyched up. (#3)

<p>Teammate interactions + Personal performance / skill execution →⁷⁵ In-match: Feel – frustrated</p> <p>Teammate interactions →⁴⁹ Pre-match: Feel – relaxed</p>	<p>In fact I can think of a specific example where [teammate name] turned the ball over in the first half of the [opponent's name] game and I was two yards away from him and he just like put it into my path and I literally didn't even get a sniff on it, and I still don't know how, and he said, "Fuck sake" or whatever. And I was just, "Aargh." It was so frustrating. (#3)</p> <p><i>Non-thriving group:</i> On Saturday I was really relaxed, I was quite chilled, and I was humming, while usually I go quite quiet, but I was having some chat, some banter, with the boys and stuff. Yeah, I just felt pretty good. I felt relaxed and ready to play. (#18)</p>
<p>Opponents + Perceived match importance + Expectations →¹⁴ Pre-match: Feel – excited</p> <p>Opponents + Perceived match importance + Expectations →¹⁴ Pre-match: Feel – excited</p>	<p><i>Thriving group:</i> I am excited to go to bed because the competition is always good and I enjoy going out and trying to fight the point. Especially like the game against [opponent's name] who are going to be at the top of the table as well, it should be a pretty intense game, they play good hockey, I look forward to it a lot. (#6)</p> <p>I do think there are certain games, [opponent's name] it's quite feisty, it obviously means a lot. I know quite a lot of the [opponent's name] guys because I live in [city] and a few of them I have played junior hockey with so that always makes it more feisty. Funnily, they are the easiest games to get up for, if you can't get up for a game like that, then for me there is something wrong. (#6)</p>

<p>Opponents →⁴⁰ Expectations</p>	<p><i>Non-thriving group:</i> Well [opponent's name] won the league last year, but all their players are out in [country name], so they had quite a bad squad. So, I think we went into that game, we knew that we could easy win three points, but if they had their main players I think it would've been a lot different. (#9)</p>
<p>Opponents →⁴⁰ Expectations →³⁵ Targeted playing standards + Personal performance / skill execution →¹¹² Performance satisfaction / dissatisfaction</p>	<p>Coming into the game I knew [opponent's name] present a very good technical challenge for me. Being a defender, they've got some really, really good offensive orientated forwards and it was always going to be a tough job to contain them for the full 60. That was one of my objectives ... I would say, on the whole, I defended reasonably well. I was quite pleased with what I was doing defensively against them. Made a few interceptions, key intercepts. (#13)</p>
<p>Opponents + Past performances →³⁷ Targeted playing standards</p>	<p>I reflect back on experiences that I've had before against [opponent's name]. That counts for a lot. All the positive moments that I've maybe had. As an example, I played [opponent's name] in [place name], and I remember doing this against a certain individual, and I did it again a few years afterwards. And was thinking that 'I've done this twice now against this guy, there's a good chance that I'm going to do it again'. So that sort of... I guess that's psychological as well. So reflecting back on positive experiences. Yea, some negative experiences as well. I've done some bad things against [opponent's name] in the past and I'd</p>

<p>Opponents + Perceived match importance →¹¹ Pre-match: Feel – uptight →⁸⁶ Team performance</p>	<p>reflect on those as well and make sure I'd try to learn from what I did do badly and how I can correct it. (#13)</p> <p>I don't know whether we feel a bit tense when it comes to big games. Looking back at it, when we have played against big teams we never seem to do well. I don't know if we feel a bit tense, we feel like people have to do things or we just become a bit jointed and look for other players to do things rather than taking it on your own. So in terms of performance, maybe just treating it as a normal game could have helped. (#15)</p>
<p>Opponents →¹⁶ Perceived match importance Opponents + Team performance + Self-critical →¹¹⁰ Lack of fulfilment Personal performance / skill execution + Match outcome + Teammate performance →¹¹⁷ Enjoyment levels</p>	<p>It was real important that we win that game, because of where we are in the league against them ... But the team we played against weren't very good. They were missing players, I reflected back on it after the game, okay, we've done a job, we've done what we needed to do, but the team we were playing against were poor and we could have beaten them more convincingly than we did. So that's how I've left it. I enjoyed playing and I enjoyed the fact that I scored and we won, and that the other guys got goals that they needed to get their season and confidence building and the points, and everything like that, but it wasn't as fulfilling as when we beat them last time, a couple of weeks ago when they had all of their better players playing. (#16)</p>
<p>Opponents + Personal performance / skill execution →¹⁰⁹ Enjoyment levels</p>	<p>I was up for the game, really wanted to win, because I knew the importance of the game and three points. I was really up for it, in that</p>

<p>Opponents + Perceived match importance →¹¹ Pre-match: Feel – determined</p>	<p>case, and also, the guy I run my clothing company for, plays for [the opponent's name] in goal. So there was a direct sort of correlation between me playing and scoring and having like a grudge with him, which is quite fun and added a bit of extra enjoyment to the game. So I was up for the game in that respect. (#16)</p>
<p>Opponents + Past performances + Expectations →³⁹ Pre-match: Feel – confident</p>	<p>I have got a pretty good record against [opponent's name] personally so I was feeling pretty good to be honest and I knew that they had a much weaker team this week as well because most of their [international] guys were away, so that was there as well that we should steam roller them really. (#17)</p>
<p>Opponents →⁷² Team performance →⁸⁹ Personal contribution</p>	<p>On Saturday I think I just felt that we would make a pass and then we'd try and go forward, instead of actually being patient, but we almost weren't allowed to do that, because [opponent's name] would step up and stop us making passes between me and [teammate's name] ... So I think that was probably one of the main reasons why I felt that I couldn't have an impact because I'd pass it to [teammate's name] and then I wouldn't get it back. I just probably didn't get the ball and wasn't able to make passes forward as much as I wanted to. (#18)</p>
<p>Past performances + Familiarity →⁵¹ Pre-match: Feel – confident</p>	<p><i>Thriving group:</i> When we played these games 5 or 6 years ago I would have been a different person with different feelings and I think experience does a lot with that. And playing at the highest level in club level over here, helps a lot also. . . . It's a nice feeling now to just step onto the pitch</p>

<p>Past performances →⁵⁶ Pre-match: Feel – confident</p>	<p>and play against the world's best ... there's a fine line between confidence and arrogance and I think playing over here, we have a nice level of confidence, the guys who are playing at the top level the whole time. You know, you're not really questioning "am I sharp enough?", "am I fit enough?" because if you weren't then there would be something drastically wrong with the league over here and my lifestyle. (#1)</p>
<p>Past performance →⁵⁶ Pre-match: Feel – determined Past performance →³⁶ Targeted playing standards + Personal performance / skill execution + Self-critical →¹¹⁴ Performance satisfaction / dissatisfaction</p>	<p><i>Non-thriving group:</i> We had some good results against some good teams, that probably we hadn't done so well against in the actual season, so I think we were pretty confident. Yeah, I'd definitely say we were quite confident and we could go and get into the final and probably win the tournament, or win the play-offs as well. (#12)</p>
<p>Past performances + Team performance + Match outcome →¹⁴² Enjoyment levels</p>	<p>The week before first time of having not the best game. I wanted to come out and put that right, and then to get the first half right with a clean sheet and a couple of good saves and then the second half ... I mean they are not catastrophic errors but the first corner I should be saving probably 10 times out of 10 to be fair ... we were only 1-0 up and it was actually a really important time to make a save and I didn't and that's kind of what hit me harder I think. (#17)</p> <p>I enjoyed it because we were a lot better as a team than [opponent's name] and I enjoyed it that we came off, because the week before we</p>

	<p>didn't have the best of games and we lost to [previous opponent's name] which is a side we should have beaten but, yeah I obviously enjoy winning and enjoy it when the lads are all happy. (#17)</p>
<p>Familiarity \rightarrow^{42} Preparation – stress-free $\leftrightarrow^{N/A}$ Preparation – typical</p>	<p><i>Thriving group:</i></p> <p>I like to get up a bit early and work my way into the day and give myself that little bit of time. I really don't like rushing before a game. That is the worst thing. I normally pack most of my stuff the day before so I don't have to run around because then I would feel flustered and I think that would affect my game directly. (#3)</p>
<p>Familiarity + Arousal regulation strategies \rightarrow^{47} Pre-match: Feel – relaxed</p>	<p>Overall, pretty relaxed, I am never nervous until we are sort of in the changing room and then start a bit of adrenaline. I wouldn't say it's from nerves but sort of getting ready for the game probably, until then I am fairly relaxed. I guess, having played a lot of hockey, I am used to that sort of scenario and yeah I tend not to try and think about it too much until I get there. Then you are sat there and you know what you have got to do, so yeah, pretty relaxed overall. (#6)</p>
<p>Familiarity \rightarrow^{57} Expectations \rightarrow^{55} Pre-match: Feel – relaxed</p>	<p><i>Non-thriving group:</i></p> <p>I think quite lucky to have played in [international competition's name], which is in front of bigger crowds, also I played in the play-off tournament to go into the Premier League and the relegation one, so kind of used to playing in those tournaments because I'd done two of them before. So I was quite lucky in that respect I guess, that kind of been there and played in them before, so knew what to expect, so I was</p>

<p>Familiarity →⁵⁸ Arousal regulation strategies + Automaticity</p>	<p>actually fine. What does 'fine' mean for you? Is that relaxed, is that excited, is that pumped up, what does that sort of look like for you? Normally, yeah, quite relaxed to be honest, until you step onto that pitch. (#12)</p> <p>For me, I know how to get myself ready and if I find myself thinking about a game all the time then I almost get too in to it and too hyped up and I'm not at my best then. So, being relaxed, not thinking about it too much, just playing hockey, playing on instinct, that makes it a lot easier for me to play the best I can. (#18)</p>
<p>Targeted playing standards + Self-critical + Personal performance / skill execution + Personal contribution →¹⁰¹ Performance satisfaction / dissatisfaction</p> <p>Targeted playing standards + Self-critical + Personal performance / skill execution →¹¹⁴ Performance satisfaction / dissatisfaction</p> <p>Targeted playing standards + Personal performance / skill execution + Personal contribution →¹⁰⁰ Performance satisfaction / dissatisfaction</p>	<p><i>Thriving group:</i> I was pretty happy. I just have to do my role to the best of my ability and I'm my number one critic so...they always say that consistency is the most important thing at the highest level and that's all I aim to be, consistently good and sound. And I was overall pretty happy. (#1)</p> <p>I can still remember two things from both games that I really wish I didn't do, because I know I can do it better. Of course I won't forget the 97 good things that I did but, I would have preferred 100 good things instead of 97 so I remember them clearly in my head. (#1)</p> <p>I think from what I mentioned earlier, which I wasn't expecting myself – I based that score on sort of not how many players I beat or anything like that, it's being as consistent as I can be, especially being back in</p>

<p>Targeted playing standards + Personal performance / skill execution →¹¹² Performance satisfaction / dissatisfaction Preparation – sub-optimal</p>	<p>that game. The breakdown of skills is probably what I would look at and make sure my pass completions are pretty good and I'm not making any unforced errors. I knew that maybe I was going to have a couple of things that weren't quite at the top of my game but I rate myself on that in terms of how much I competed with the opposition. I guess, how much of a positive influence I felt I was having as opposed to if they didn't have me. (#6)</p> <p><i>Non-thriving group:</i> Argh, absolutely terrible. Nothing didn't go wrong for me, I just didn't do things well enough. First touch wasn't there. To be honest, probably mentally I wasn't there. Physically I'm probably okay... but I was underprepared really in comparison to the other lads... overall, completely dissatisfied really. (#10)</p>
<p>Targeted playing standards + Personal performance / skill execution + Personal contribution →¹⁰⁰ Performance satisfaction / dissatisfaction Lasting frustration / anger →¹³⁵ Performance satisfaction / dissatisfaction</p>	<p>I can't really tell you how many times I did something well. I can only remember a couple of passes around the back maybe. Maybe 0 was extremely harsh, but maybe could have pushed a 1, but I probably give myself a 0 on the Friday night because that was the mood I was in.... I didn't feel I did anything to help the squad. I actually felt like I hindered the team. I've set myself standards and I didn't meet any of them. Even defensively-wise, a couple of times I left the boys...yea I've set standards forward and defensively and I didn't complete both of them, I didn't get near them. That's probably why I gave myself overall a 0. Probably a 1 if I look back on it. (#10)</p>

<p>Targeted playing standards + Team performance →¹²⁶ Lasting frustration / anger</p> <p>Targeted playing standards + Team performance →¹²⁷ Match satisfaction / disappointment</p>	<p>Yeah, I'm still a bit frustrated, just having watched the goals back that we've conceded ... a big thing we spoke about before the game is, we don't want to come off the pitch and feel that we haven't given a hundred-percent, and that we want to obviously go out and play as well as we know we can play. And I think definitely for me ..., I just don't really think that we're happy with the performance we put out in that game. (#12)</p>
<p>Targeted playing standards + Self-critical + Personal performance / skill execution →¹¹⁴ Performance satisfaction / dissatisfaction.</p>	<p>You know it was kind of like 'that frankly wasn't good enough. Just, right it has happened now, let's make sure that we don't do anything else wrong'. And then the last goal maybe a bit over critical but I still think, when the ball came across goal I saw somebody trying to come in for a deflection and they missed it, it's still a bit hard but that is still something I should be saving. (#17)</p>
<p>Targeted playing standards + Personal performance / skill execution →¹¹² Performance satisfaction / dissatisfaction</p> <p>Targeted playing standards + Personal performance / skill execution →¹²¹ Lasting frustration / anger</p>	<p>I came in at half time feeling pretty chuffed because my aim is always strive for the perfect game, do everything you can to get this clean sheet and when you get half of it ... it's just frustration as well, the couple of goals shouldn't have gone in really. (#17)</p>
<p>Perceived match importance →¹⁹ Less pressure</p> <p>Preparation – atypical →^{N/A} Preparation – stress-free</p>	<p><i>Thriving group:</i></p> <p>It was the first game in about 9 months that didn't have massive pressure or massive baring on what would happen if we didn't win. It was also a game where we weren't training a lot together, I think we'd been a month apart and we were a bit disjointed and staying in different</p>

	<p>peoples' houses and hotels and just coming together to play the game was quite different ... So yea, it was different. I was nice different too because it was more relaxed and playing hockey ... Still competitive and still focused, of course, just not as much riding on it because they're just test matches. (#1)</p>
<p>Perceived match importance →¹⁸ More pressure</p>	<p>Obviously there was a bit more pressure on it [the match], and it was a different place, but I felt exactly the same as I was feeling, maybe not in the practice, but any other league matches. (#2)</p>
<p>Perceived match importance →¹² Pre-match: Feel – excited Perceived match importance →¹² Pre-match: Feel – determined Pre-match: Feel – nervous</p>	<p>I always get a little bit nervous before each game, but I was excited because it was my last National League game for [team name], so I had the mind-set that 'this is it, it's my last game, I've got to give it all' and the mind-set of 'this is the last time I'm going to play for the club in the National League, so I've got to do as well as I can'. (#7)</p>
<p>Perceived match importance →¹⁸ More pressure + Pre-match: Feel – determined →¹⁴⁶ Enjoyment levels</p>	<p>I can understand in a sense that it [the game being my last match] might have put more pressure on me, but I actually think that I didn't let it hurt me, because I quite like having that mind-set of 'right, this is it, I've got seventy minutes to just put all my effort in, all my energy in' and there's nothing else on the pitch. Quite enjoyed it. (#7)</p>
<p>Perceived match importance →¹⁸ More pressure →⁸⁸ Team performance</p>	<p><i>Non-thriving group:</i> You mentioned earlier you feel like as a team you didn't turn up. Yeah.</p>

<p>Perceived match importance →¹⁵ Targeted playing standards + Personal performance / skill execution + Personal contribution →¹⁰⁰ Performance satisfaction / dissatisfaction</p> <p>Perceived match importance →¹⁸ More pressure →²⁷ Pre-match: Feel – uptight Pre-match: Feel – nervous ↔^{N/A} Pre-match: Feel – excited</p>	<p>Why do you think that might've been the case?</p> <p>I think possibly because there'd been such a focus on one game and obviously the outcome of one game. I think something like that is enough in terms of pressure and nerves or whatever, to make a lot of people think, 'right well this is it, we've played eighteen games this season, to get to this one game and so much of our training and so much of our preparation has been for this game'. I guess just the thought of that has the potential to pile on that extra pressure and create those extra nerves; that'd probably be the main thing I would say to be honest. (#12)</p> <p>Probably not too bad to be honest, playing in big games like that, that's only about obviously playing unbelievably well, almost getting stuck in and, because they're normally quite tight games, really just doing basic things and obviously contributing and any other way that you can for the team, so yeah, probably not too badly. (#12)</p> <p>I don't know whether maybe the extra bit of pressure from the play-offs that made me a bit more tense again... I always tend to feel nervous but sort of excited as well. I reckon pretty pumped for the game like I usually would be but then obviously a little bit of nervousness, which I think is good. Obviously it was a big game so there was obviously pressure for that and so usual for a big game against a big team. (#15)</p>
<p>Preparation – atypical →^{N/A} Preparation – rushed</p>	<p><i>Thriving group:</i></p> <p>I think the preparation was a wee bit rushed because we had 5 minutes</p>

<p>Preparation – atypical $\rightarrow^{N/A}$ Preparation – stress-free \rightarrow^{45} Pre-match: Feel – relaxed</p>	<p>less. So personally I thought I wasn't going to make the toilet run that I normally do because they said 'right, we're starting in 5 minutes' and I rushed in anyway and got back out just as we were changing so that was fine. From my point of view that didn't leave too much. (#4)</p> <p>Probably with that earlier wake up anyway, I had more than enough time to get all my stuff together and yeah, I was pretty relaxed and ready to go really. (#7)</p> <p><i>Non-thriving group:</i> See previous</p>
<p>Preparation – typical $\leftrightarrow^{N/A}$ Preparation – stress-free</p> <p>Preparation – typical $\leftrightarrow^{N/A}$ Preparation – stress-free</p> <p>Preparation – typical $\leftrightarrow^{N/A}$ Preparation – rushed</p>	<p><i>Thriving group:</i> Yea that day on Friday, I just had a nice relaxed day. I did everything that I'd normally do. (#1)</p> <p><i>Non-thriving group:</i> Yeah, relax normally in the morning and then, yeah travel to the game, that's pretty typical. (#12)</p> <p>Quite typical in terms of a rush in the morning, I am not very organized, so packing my bag, getting all my stuff out the washing, you know out of the tumble dryer, I normally leave late so I normally drive to the ground really quickly. I tend to naturally be late for everything I do, but whenever I kind of have almost a bit too much time and almost drive safely, I don't tend to find I play as well. (#17)</p>

Preparation – stress-free → ⁴⁵ Pre-match: Feel – relaxed	<p><i>Thriving group:</i> I was pretty relaxed really, I didn't really do a whole lot... Because it's quite a long gap in between waking up and actually playing the game, so, get all my stuff and my kit ready, do it quite early because I didn't want to be rushed about, with all the stuff. (#7)</p> <p><i>Non-thriving group:</i> See previous</p>
Preparation – sub-optimal → ⁶⁹ Personal performance / skill execution	<p><i>Thriving group:</i> See previous</p> <p><i>Non-thriving group:</i> That [my preparation] was the main factor why I think I played so poorly. Probably...I knew I wasn't mentally prepared. As in, I was conscious that I wasn't up for it, so that was probably why yea. (#10)</p>
Arousal regulation strategies → ⁵⁰ Pre-match: Feel – relaxed	<p><i>Thriving group:</i> Relaxed, I don't like getting fired up or anything like that, I like to stay relaxed. Obviously everyone's different in things like that, but I like staying relaxed and just focusing on things that I need to do to do well. (#2)</p> <p><i>Non-thriving group:</i> See previous</p>
Pre-match: Feel – nervous ↔ ^{N/A} Pre-match: Feel – excited	<p><i>Thriving group:</i> I say I usually get a little bit nervous, there's always that combination</p>

	<p>of nerves and excitement going on. I'm not always completely, a nervous wreck for one game and excited for another, but I think there's always that combination and I think – the balance just seemed pretty good. (#7)</p> <p><i>Non-thriving group:</i> See previous</p>
Pre-match: Feel – relaxed \leftrightarrow ^{N/A} Pre-match: Feel – excited	<p><i>Thriving group:</i> See previous</p> <p><i>Non-thriving group:</i> Just really looking forward to it, really excited. And pretty relaxed as well. (#14)</p>
<p>Critical moment \rightarrow⁷⁸ Personal performance / skill execution</p> <p>Critical moment \rightarrow⁹⁰ Team performance + Match outcome \rightarrow¹³⁶ Lasting frustration / anger</p>	<p><i>Thriving group:</i> I think I started well and I was really focused on the game and then ... after the first, I think it was eight-minutes, I came off, and I came off for about ten-minutes and it kind of threw me, because I didn't know what was going on. [When I came back on] I still played alright, but compared to what I was playing like in the first probably eight-minutes, nine-minutes, I don't think I reached that level again. (#2)</p> <p>Because we were 3-1 down, got back to 3-3 playing against number 6 in the world. And then threw it away because of one thing, then our heads went down. I don't know why they went down, perhaps because we went a goal down. But I think because we'd worked so hard to get</p>

	<p>back on level terms...to let one goal pull us down, it was annoying, because that wasn't the true score line of that game. (#4)</p> <p><i>Non-thriving group:</i> N/A</p>
Automaticity → ⁶⁷ Personal performance / skill execution	<p><i>Thriving group:</i> N/A</p> <p><i>Non-thriving group:</i> I felt I was seeing the ball really well that day and that always makes me feel I have got a bit more time to think. When I don't see the ball as well and it's all automatic, that's when I find I am playing at my best and I was seeing the ball really well and it felt like the ball was going a lot slower than normal. (#17)</p>
Automaticity → ⁶⁷ Personal performance / skill execution	<p>It didn't feel quite that auto pilot, I felt I was seeing the ball really well which sounds like it should be a good thing but then it feels like I am controlling my body movements rather than happening automatically. (#17)</p>
Equipment → ⁶² Personal performance / skill execution	<p><i>Thriving group:</i> N/A</p> <p><i>Non-thriving group:</i> Offensively though, which is another area of my game which I tend to look as a strength, I probably wasn't so good. That was maybe down</p>

	to the fact that I was using a new stick for the first time and a new brand...I know it's going to sound draft, ...my touch was fine, but it was a different feel when I came to dribbling, so I maybe didn't dribble as much as I normally would have in that match. (#13)
<p>Self-critical + Personal performance / skill execution + Team performance + Match outcome →¹¹⁹ Performance satisfaction / dissatisfaction</p> <p>Team performance →¹³⁷ Lasting frustration / anger</p>	<p><i>Thriving group:</i></p> <p>I think when you play well I think that eight is a decent score out of ten, really. I don't think you can really achieve ten unless you have an absolute blinder. There's always something that you could have done a little bit better ... But then, looking back, I thought it went well. Obviously, there's always area to improve. Obviously, we conceded a few goals as well, which was a bit annoying, which was probably why I didn't — maybe it was a seven out of ten, I'm not really sure. We won the game, I was in a positive state of mind and I thought I played well, so, yeah. (#7)</p> <p><i>Non-thriving group:</i></p> <p>There's a few things that I guess I still reflect back on and think 'I could have done this better'. But you...I don't want to say it affects you...it's different, you sort of bank what you've learned and you put it into a store and you've got it there for whenever you need it. (#13)</p>
<p>Self-critical + Personal performance / skill execution →¹²² Source for future reference</p>	
<p>Self-critical + Personal performance / skill execution →¹¹⁶ Performance satisfaction / dissatisfaction</p> <p>Personal performance / skill execution →¹²⁰ Increased confidence</p>	<p>Just being the way that I am, I don't think that I'd ever give myself a 9. I'm always looking for the negatives in my game. After the game I'd always focus on the things I've done badly and how I think I could improve them. But the positive bits do give me confidence, I just</p>

<p>Self-critical + Personal performance / skill execution + Personal contribution →¹⁰² Performance satisfaction / dissatisfaction</p>	<p>always want the perfection and focus on the negatives. There's always some things you can do better. (#14)</p> <p>It's pretty natural for me to think about when I'm playing and look at the negatives and what I could have improved sort of thing. And as I said the main part of my game is getting about the pitch and hassling other players and disrupting their rhythm, sort of like just getting about them and I just feel like without my main attribute and I didn't do that very well. I don't think I did that very successfully. I don't think I defended that well. I was very disappointed with that and then on the ball I don't think I made an impact at all on the game so I wasn't disrupting their game and I wasn't making a positive impact on our game. So that's why I scored myself pretty low. (#15)</p>
<p>Self-critical + Personal performance / skill execution →¹²³ Lasting frustration / anger</p> <p>Personal performance / skill execution →⁷⁷ Personal contribution</p>	<p>I was good, I scored a couple of goals, so I had an impact on the game. I've had better games, I missed chances in the game, so that frustrated me. I think I'm quite self-critical, I know how many mistakes – I remember mistakes and if I hadn't have scored at the weekend, but I'd made the mistakes I made, I would have thought I'd had a bad game. (#16)</p>
<p>Self-critical + Personal performance / skill execution →¹²³ Lasting frustration / anger</p> <p>Personal contribution →¹⁰⁶ Lasting frustration / anger</p>	<p>Just personally, a bit selfishly, frustrated that I could have contributed more to the outcome ... [I] should have done better on those two goals really. (#17)</p>
	<p><i>Thriving group:</i></p>

<p>Player absence →⁸⁷ Team performance Match intensity →¹⁴⁵ Enjoyment levels</p> <p>Player absence →⁸⁷ Team performance</p>	<p>I really enjoyed it, it was probably not the best hockey that we've played but it was a pretty intense game with both teams missing a few people, the intensity was still pretty good so, I really enjoyed it. (#6)</p> <p><i>Non-thriving group:</i> We had a few missing. So we had at least three missing, maybe more. So, it didn't matter too much, but a couple would have made a difference, to our slickness, probably. (#16)</p>
<p>Match format →⁸¹ In-match: Feel – energetic / good</p> <p>Match format →⁹² Personal contribution In-match: Feel – energetic / good</p>	<p><i>Thriving group:</i> N/A</p> <p><i>Non-thriving group:</i> Recently changed into four 15-minute periods. And you get two and half minutes of between each period, and then I think it's 10 minutes off at half time, so that leant itself to being able to recover...or having a bit more recovery time than was it normally would in a 35 minute each way hockey match, so I guess, from a fitness point of view, and from a feeling point of you, I felt quite good. (#13)</p> <p>A massive difference compared to our usual routine is that it [the match] was quarters, whereas before it's obviously halves. I wasn't expecting to start but obviously came on in the first quarter about a minute to go... so I was on for a very short period of time and then we stopped and then back out again, so maybe that didn't help. ... I just feel like I couldn't get into the game as much as I would usually. So</p>

Match format → ⁹² Personal contribution	<p>feeling energetic but just couldn't really get it going and I think that's maybe due to some of the breaks that were in the game rather than of you getting into the game. (#15)</p> <p>Like I said with the breaks in the game it wasn't easy to get into the game so, I don't know, I think it is difficult because you have only got fifteen minutes per quarter which makes a massive difference compared to obviously thirty-five minutes. (#15)</p>
Match intensity + In-match: Feel – energetic / good → ¹⁴⁰ Enjoyment levels	<p><i>Thriving group:</i> I just really enjoyed the game, the intensity, the speed of it, enjoyed my feeling. I didn't feel unfit or out of breath, if anything, I felt the opposite, that I could have continued on and on. And that's always a nice feeling that you take with you during and after the game. (#1)</p> <p><i>Non-thriving group:</i> N/A</p>
Teammate performance → ⁹⁴ Personal contribution	<p><i>Thriving group:</i> We are experienced enough to take on the mantle of whatever you call it and just do what we have to do, fulfil our roles. But, when I suppose one or two of them are not doing that in the games...like, for example, we expected a lot more from [teammate name] on Friday night, we keep forgetting that he is young of course, but he'd be one of our top players now and he was just, the same as me, physically exhausted as well. But when he didn't play, does that affect us or me in saying I had to do more? Potentially yes. I suppose you try and take on more and do more.</p>

<p>Teammate performance →⁸³ In-match: Feel – frustrated</p> <p>Teammate performance →⁸³ In-match: Feel – energetic / good</p>	<p>(#1)</p> <p>Frustration. Because I didn't really understand why I wasn't playing, and these guys that hadn't been training were playing more than me, I was very frustrated, especially when one of them cost us a penalty flick and a ten-minute yellow, which pretty much caused us, well just handed the game to them. (#2)</p> <p>Obviously, I think it's common that when we score, everyone gets a boost. We got five goals, so, every time someone went in, 'yeah, yeah, come on, we can do this'. (#7)</p> <p><i>Non-thriving group:</i> See previous</p>
<p>In-match: Feel – nervous →⁸² Team performance</p>	<p><i>Thriving group:</i> We do play fast, quick hockey, and I just don't think we had that cutting edge. I don't know if it was we were a little bit nervous or what, because we created the chances, we just didn't score them. (#5)</p> <p><i>Non-thriving group:</i> N/A</p>
<p>In-match: Feel – confident →¹³⁹ Source for future reference</p>	<p><i>Thriving group:</i> I definitely feel very positive about it and I think in future that will be the kind of game I reflect on. When we were talking about thinking positively before a game, I will definitely be casting my mind back to</p>

<p>In-match: Feel – confident + Match outcome →¹³² Performance satisfaction / dissatisfaction</p>	<p>the second half because as I say that was as comfortable as I had been in that league. (#3)</p> <p>Personally, I thought it went pretty well. And I think that's probably what – a good result as well, and I just felt it was one of my better games in the past year. I'm not entirely sure why, but I just felt a little more confident on the ball and I felt it went well. (#7)</p> <p><i>Non-thriving group:</i> See previous</p>
<p>In-match: Feel – energetic / good + Personal performance / skill execution →¹¹³ Performance satisfaction / dissatisfaction</p> <p>In-match: Feel – energetic / good →¹³¹ Performance satisfaction / dissatisfaction</p> <p>In-match: Feel – energetic / good + Personal performance / skill execution →¹¹³ Performance satisfaction / dissatisfaction</p> <p>In-match: Feel – energetic / good + Personal performance / skill</p>	<p><i>Thriving group:</i> I actually felt that I ran hard, thought I got a lot of good pressing done within the game, got on the ball at a couple of corners, and I actually felt it was one of my better games recently. (#4)</p> <p>But on a personal note, I thought I played well. My work rate was as it was normally, which is quite high, so there was definitely the effort there. I was quite happy with the way I played. (#5)</p> <p><i>Non-thriving group:</i> I got a goal, was decent enough, was happy with how I played. Felt quite good during it, decent amount of pitch time. So yea, I was happy enough. (#14)</p> <p>I think once I got to the game I was feeling good. So it was all down to</p>

<p>execution →¹¹³ Performance satisfaction / dissatisfaction</p>	<p>me. We'd done all of the preparation stuff before the game. It was just my performance. I would never rate myself higher an 8 I would say, I never think you are a 9 or 10. It's pretty hard to be up there at this level. (#14)</p>
<p>Personal performance / skill execution + Personal contribution + Match outcome →¹⁰⁴ Performance satisfaction / dissatisfaction</p>	<p><i>Thriving group:</i></p> <p>Well I suppose when you look at the score line and I'm part of the defence and we concede 6 goals, straight away I'm like "this is not good". Just before half-time when they were 2-1 up and I had the ball at centre back and there was 20 seconds to go and my experience should have told me to keep the ball between our two centre backs because they weren't looking to step out and win the ball... [But] I ran towards them, played it towards our right back, who got dispossessed and then they [the opponents] scored a crappy third goal just before half-time. So that was another thing, that was more judgement than anything. And I dunno, maybe 6 or 7 would have been ideal, but again I don't think I could warrant giving myself a 7 after losing 6-3 to [opponent's name]. (#1)</p>
<p>Personal performance / skill execution →⁷⁴ In-match: Feel – confident Critical moment</p>	<p>It was a game of two halves. The first half I think was pretty bad. I think in hindsight it wasn't maybe as bad as I thought but the second half was much better. The second half was probably as confident as I've been in that league...</p> <p>Why was the second half better?</p> <p>It can be simple things like if you just trap a ball and make a good pass or if you do anything well it builds your confidence and then the next</p>

<p>Personal performance / skill execution →¹¹⁵ Performance satisfaction / dissatisfaction</p>	<p>time you get the ball you do something good again and it just snowballs. (#3)</p>
<p>Personal performance / skill execution →¹⁰⁸ Step forward</p>	<p>I missed a few traps that were fairly basic to be honest. I don't know, I think the first half would have been maybe like a five and the second half a seven. (#3)</p>
<p>Personal performance / skill execution →¹¹⁵ Performance satisfaction / dissatisfaction</p>	<p>I'm always thinking in terms of what has this [match has] done to help me secure a more permanent place in the team and I think that was definitely a big step in the right direction. Not just from how I played as a game but in communicating afterwards and talking through it. (#3)</p>
<p>Personal performance / skill execution →⁷⁷ Personal contribution →¹⁰⁵ Performance satisfaction / dissatisfaction</p>	<p>You know those sort of moments where you are required to do something or there's maybe a little glory run, or something? I don't know, those sort of things stay in your mind, after the game. There was a moment where there was nearly a score, I had to dive and play a pass and that stuck in my mind, something I did right, and then obviously I made a fair few runs down the line with the ball and had good outcomes, so I think that's probably there. I actually ran down a few short corners at the weekend, and that was quite a big thing as well, if I get pretty much to do that, I feel like I've done my job, done my job well. (#7)</p>
<p>Personal performance / skill execution →¹²⁰ Increased confidence</p>	<p>I think it [the game] just re-confirms that you deal with the strain and then when you get to the game, you can actually compete at that level,</p>

<p>Personal performance / skill execution + Personal contribution →¹⁰³ Performance satisfaction / dissatisfaction</p>	<p>and just reassures that in your mind. You're good enough to play, and I think the more games you have that you've played well in, the more you believe in yourself. (#7)</p> <p><i>Non-thriving group:</i></p> <p>You said the game went well for you and you're pleased with the way that you performed, and you scored one or two?</p> <p>Two.</p> <p>Two, and then assists as you said.</p> <p>Yeah.</p> <p>Are they sort of the only things that you kind of gauge against when you're assessing your own performance or are there other factors that you think are important?</p> <p>Obviously that's a big aspect of it, but then I think work rate as well, for me and pressing as well. I think pressing's a massive thing for a forward. Like it's the forward press as well, it makes the people behind us gain a lot easier. If we're pressing hard and trying to push onto the back four, it makes it easier for the people behind us. (#9)</p>
<p>Personal performance / skill execution →¹²⁰ Increased confidence</p>	<p>Is there any other lasting impact that you think that the game will have on you moving forward?</p> <p>Yeah, confidence to score now. That's probably a big factor. (#9)</p>
<p>Personal performance / skill execution →¹¹⁸ Source for future reference</p>	<p>It [my performance] gave me a reality check that I'm not just going to come back in slip back in. (#10)</p>

<p>Personal performance / skill execution →¹¹⁵ Performance satisfaction / dissatisfaction</p> <p>Personal performance / skill execution →¹²⁴ Lasting frustration / anger</p>	<p>Mixed bag. As in frustration...I felt I played quite well, but at the same time fucking three goals went in. ... A couple of nice early saves and then I let in a goal, nothing I could do about it. And then I made a good save but they scored the rebound, I was a little frustrated with the rebound and then they scored a corner. So more frustration. I didn't feel I played poorly but at the same time I didn't light the world up...if you looked at it in a purely performance way, it was a good performance, I just didn't do anything out of this world. I was solid. But satisfaction was pretty shit, it was low on satisfaction. (#11)</p>
<p>Personal performance / skill execution →¹²⁴ Lasting frustration / anger</p>	<p>I'd say 6 was probably a little harsh. Probably a 7, but it still pisses me off ... it's weird, like hockey has been going so well...like even though I didn't play badly, it has still been pissing me off this week which is rare. That's extremely rare. Usually I'd brush that off, I don't give a shit and go straight back out. (#11)</p>
<p>Personal performance / skill execution →¹²⁴ Lasting frustration / anger →¹³⁸ Increased motivation</p>	<p>Definitely extra motivation but the last thing I did we conceded a goal. So that fucked me off. If that had happened in the first minute I could have rectified it in the rest of the game, but that was the very last minute of playing, so that annoyed the shit out of me. (#11)</p>
<p>Personal performance / skill execution →¹²⁴ Lasting frustration / anger →¹³⁵ Performance satisfaction / dissatisfaction</p>	<p>It wasn't a 7 [rather than a 6] because I was pissed off after the game. It wasn't a 5, because if you look at it plain and simple, I didn't really play badly. I just didn't light the world on fire. (#11)</p>

Personal performance / skill execution → ¹¹⁸ Source for future reference	But I'm sure it's [the game is] something I will come back to, I'll definitely probably come back to when we start again next season. (#12)
Personal performance / skill execution + Personal contribution → ¹⁰³ Performance satisfaction / dissatisfaction	Just misplaced a few passes and stuff, but that's going to happen I suppose. Like I was happy enough with how I played, but I'd just like to get even more touches and try to dictate the game even more. (#14)
Personal performance / skill execution + Personal contribution → ¹⁰³ Performance satisfaction / dissatisfaction	I was quite disappointed really. When I came on I just didn't feel like I got into it as well as I could have. I don't think I used my main strengths which is like getting about the pitch and just getting stuck in, so I didn't feel it was great on Saturday. (#15)
Personal performance / skill execution → ¹¹⁵ Performance satisfaction / dissatisfaction	Before that [the match] I thought I was playing some of the best hockey that I had, but obviously it [my performance] was very disappointing at the weekend. (#15)
Personal performance / skill execution → ¹¹⁵ Performance satisfaction / dissatisfaction	Personally I was happy with the first half [performance], second half I was disappointed with myself. (#17)
Team performance → ¹⁴¹ Enjoyment levels	<p><i>Thriving group:</i> See previous</p> <p><i>Non-thriving group:</i> Did you enjoy the game?</p>

<p>Team performance →¹⁴³ Training alterations</p>	<p>Not particularly, obviously result aside, we didn't really turn up to be honest. (#12)</p> <p>Do you think that there are any particular lessons that will come out of that semi-final?</p> <p>Yeah, yeah, well definitely like to think so. So potentially the way that we trained throughout the season so that it doesn't almost feel like we're putting everything on one game, as it felt a bit this year. Probably in the squad as well, how much time we're spending together in training ... we had two, three, four, people missing who were away for, obviously various reasons. So I think that's something massive for next year, that they will look at, to make sure that the majority of people can commit to the majority of the season. (#12)</p>
<p>Team performance →¹⁴¹ Enjoyment levels</p>	<p>Enjoyment would have been better if we had been playing better as a team. (#15)</p>
<p>Team performance →¹³⁷ Lasting frustration / anger Team performance →¹³⁰ Match satisfaction / disappointment</p>	<p>I was obviously still pretty upset on the Sunday, but I wouldn't say upset, I would say more frustrated because I knew that we, our team, could have given a much better account of ourselves and played a lot better. So maybe not consciously I'm thinking about that but I still feel a bit annoyed that we could have done better and that we didn't do that. (#15)</p>
<p>Team performance →¹²⁵ Lack of fulfilment</p>	<p>It wasn't as fulfilling as some of the other games – I think it was the</p>

<p>Team performance →¹⁴¹ Enjoyment levels</p> <p>Team performance →⁷⁹ Personal performance / skill execution →⁷⁴ In-match: Feel – frustrated Team performance →¹³⁷ Lasting frustration / anger</p>	<p>way the game finished, we went five one up, we were playing reasonable, had a good run of play and we sort of took our foot off the pedals, and we finished conceding a couple of goals and it sort of finished the game – I’m not a sour head, but it was just like a damp squid, it all fizzled out into nothing ... Even though it makes no difference at all, to the result, the performance or anything, I think that was why it wasn’t as enjoyable, as some of the other games. (#16)</p> <p>Frustrated I wasn’t getting the ball and wasn’t able to play my game. Angry that we conceded silly goals and at the end of the game I was probably more angry than anything. Just at the manner of how we lost and the manner of how they scored their goals. (#18)</p>
<p>Match outcome →¹²⁸ Match satisfaction / disappointment</p> <p>Match outcome →¹²⁸ Match satisfaction / disappointment</p> <p>Match outcome →¹²⁸ Match satisfaction / disappointment No effect</p>	<p><i>Thriving group:</i> Obviously winning would have been nice or getting some sort of a result after being 3-1 down and clawing our way back to 3-3 heading into the last quarter. I think a result would have been nice. I would have been something tangible, it’s like “we did good there” (#1)</p> <p>Obviously I'm really disappointed that we didn't win, but I can't doubt the effort that anyone put in. It's just a little bit disappointing, really. (#5)</p> <p>Do you think there's been any sort of lasting impact from the game? No, not really. I mean, after the game we didn't really speak much.</p>

<p>Match outcome →¹³³ Performance satisfaction / dissatisfaction</p> <p>Match outcome →¹⁴⁴ Enjoyment levels</p>	<p>Everyone was disappointed [with the result] and everyone knew we'd done as much as we could ... Obviously we were very disappointed and we mentioned that to each other, but we moved on pretty quickly. (#5)</p> <p>I think it was quite good. There is a lot I think to do with the feeling of having won the game, I think I actually might, at the time, rated myself something different if we had lost, even if I had had the same performance. So, I was very much up for it and I mean it was a massive result for us in the league table so, yeah, that definitely affected what I give myself. (#6)</p> <p>I enjoyed that the experience, but obviously because we lost I didn't really enjoy the game. (#8)</p> <p><i>Non-thriving group:</i> See previous</p>
<p>Enjoyment levels →¹⁴⁸ Increased anticipation</p> <p>Enjoyment levels + Match satisfaction / disappointment →¹²⁹ Increased anticipation</p>	<p><i>Thriving group:</i> But mainly by enjoying it a lot I look forward to doing it again really. (#6)</p> <p><i>Non-thriving group:</i> I really enjoyed them and this week I'm missing not playing international hockey. So it's been a bit of a come down this week. But no, I'm happy that I played all three games, looking forward to training</p>

	Saturday and getting back playing matches again. I'm looking forward to it. (#14)
--	---